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Hydraulic Mining in California.*

CONTINUED FROM PAGE 146.

Adaptability for Hydraulic Operations.—Almost all gravel-deposits are fit for hydraulic operations, provided they are gold-bearing and will admit of those improvements which are essential to this class of mining, to wit, sufficient outlet, a place of deposit for tailings, and abundance of water. After gaining the certainty that these requisites can be obtained, the miner may go to work to open his mine, confident of success. If already other mines are worked in apparently the same gravel-deposit, he may be pretty sure to find the same stratifications of gravel, cement, clay, sand, etc., and he must then judge for himself whether it will be advisable for him to drive at once a tunnel, or to ascertain first, by shaft or incline, the depth of the basin or channel.

Should the nature of the ground admit the sinking of a shaft or incline, it would be advisable to do so, since even after a tunnel is completed, water introduced, and everything ready for hydraulic operations, the opening of the mine will have to be done either by shaft or incline. It is, however, very often, and particularly in those deep gravel-deposits which were never submitted to drainage, a costly and difficult job to sink a shaft or incline, by reason of the quicksand and loose gravel. The miner must, therefore, consult the extent of his means before he ventures upon hazardous operations.

The character of these ancient deposits, generally speaking, is the same. Though they may differ in the hardness and compactness of the gravel, or may have been disturbed by local influences, still there is a prototype, the description of which may fairly apply to all. The oldest gravel-deposit found in these ancient channels is that drift deposit known under the name of the "blue lead."

The Blue Lead.—This deposit is always found deepest in the channel and nearest to the bed-rock. It is composed of bowlders of serpentine rock, talcose slate, and, in fact, of all other rocks belonging to the slate family; besides this, of quartz in bowlders, gravel and sand, with an admixture of clay, the presence of the latter being always considered a favorable sign for richness. The whole mass is of a color varying from blackish green to indigo blue. The quartz, though originally of pure white, is tinged blue, and neither washing nor exposure to air will discolor it.† Very often a deposit of huge bowlders, rather rough and angular and intermixed with only a little gravel, is found near the rim-rock—a mass resembling very much a moraine, and of no value for mining purposes. This deposit, however, will slope down toward the center or depth of the channel or basin, and the regular blue lead will appear on the top of this, "moraine," sometimes only a few inches in thickness, but gaining steadily in size in the same ratio as the "moraine" diminishes, till finally the bed-rock is reached by the blue lead, which may have gained a thickness of 40 feet or more.

This blue lead is found in deposits rising from a few inches to over a hundred feet in thickness, and is generally considered the richest and most reliable gold-bearing deposit in the country. Though tightly packed, it can be easily removed by the pick, and affords, therefore, under proper circumstances, an excellent material for hydraulic operations.

Blue Cement.—There are exceptions, however, to this condition. We find this deposit sometimes changed into the hardest kind of blue cement, yielding only to the constant application of drill and powder. This cement is generally very rich, but has to be submitted to a crushing process in mills, similar to quartz-mills. In such cases the hydraulic process can, therefore, only be applied till this blue cement is encountered, but it produces a double benefit, extracting not only the gold from the upper strata, but also freeing the blue cement from all incumbrances, and making thus its breaking up a comparatively easy matter.

Rotten Bowlders.—Next to the blue lead or cement, a yellowish or reddish gravel is found, generally very rich. It is known in some localities under the name of rotten bowlders, and is composed of quartz, gravel, and bowlders of clay-slate. This deposit is from 5 to 25 feet in thickness, in some localities even thicker. It is rather soft and easily worked, and consequently excellent material for the "hydraulic."

Upper Gravel.—The blue lead and the yellow gravel, or rotten bowlders, next to it, are the principal gold-bearing strata; still, the deposits of quartz, gravel, and sand overlying these in huge masses, contain fine particles of gold, known as flour-gold, in sufficient quantities to make the working of these upper strata sometimes very remunerative.

These different deposits gain their full characteristics only toward the deeper and more level portions of the channel or basin, and are less pronounced toward the sloping river or shore.

Quicksand.—As on the bars of the present rivers, great bodies of sand are found on the sloping rim-rock, which, under the influence of water, become quicksand and form the greatest obstacles to the sinking of shafts or inclines, whenever found. This sand seems to be nothing but crushed quartz, and yields in many instances small particles of gold. In hydraulic mining it is rather an advantage, as it offers no resistance to a stream of water and facilitates the caving of any superincumbent strata.

Iron Cement.—Small streaks of a very hard, brownish cement, generally called iron cement, from 1 to 2 inches thick, may separate the different gravel-deposits mentioned above. These cement-streaks are easily crushed by the falling bank or a blow of the sledge, and thus disposed of.

Pipe-Clay.—In almost all deep gravel deposits a sedimentary deposit is found, which is known under the name of pipe-clay. This deposit is generally found in huge masses near the rim-rock or shore of our deep gravel-streams, and is evidently the sediment of immense bodies of muddy water. Fortunately that substance, which has really the characteristics of clay, and deserves its name, is very rare in our mines and only occurs in small layers. Even thus, it is troublesome and hard to dispose of, as water will not dissolve it, but turns it into a pasty, tough substance, yielding only reluctantly to the pick.

These mud-deposits, however, known as pipe-clay or joint-clay, break under the shock of a blast into fine pieces, dissolve in water, and have generally a worse name than they deserve. Their position is always close to the rim-rock and their bulk disappears toward the deeper and more valuable parts of the gravel-deposit. To account for these facts it will be necessary to look into the origin of this so-called pipe-clay. It must be evident that the immense gravel channels of California were filled by periodical floods, occurring through long ages; furthermore, that from time to time, and particularly when the rush of the waters temporarily had lessened or almost subsided, great blockades in the ancient channel took place, keeping the remaining waters back and thus forming lakes. During such temporary intervals, bodies of mud could settle upon the underlying gravel, and, reaching from shore to shore, form in time the deposits now called pipe-clay or joint-clay. Any succeeding flood, carrying with it masses of gravel, sand, etc., would necessarily make a new channel in this mud deposit, destroying the middle portions of it, but leaving both shores comparatively intact. This explains the occurrence, near the shores, of masses of pipe-clay, which, as experience has shown, almost disappear deeper in the channel.

THE OPENING OF HYDRAULIC MINES.

The great gravel-deposits fit for hydraulic mining rest in channels or basins of unknown depths, and it is evident that, unless the depth of the channel can be ascertained beforehand, certain risks have to be taken in boring the tunnels, indispensable for almost all hydraulic operations. In the principal hydraulic mines in the State early operations were commenced from the easiest point of access, without much regard to the lasting sufficiency of the "open cut," or tunnel. The natural consequence was that only a small portion of the mine could be worked by existing facilities; the grade had to be cut down from time to time, and in most cases the constant improvements absorbed or exceeded the whole production of the mine.

The expenditures for opening a hydraulic mine, furnishing it with sluice-boxes, under-currents, etc., besides the introduction of water, generally amount to many thousands, perhaps hundreds of thousands of dollars, and only a large area of hydraulic mining-ground will warrant such an outlay. There should, therefore, be a reasonable proportion between the estimated outlay for improve-

* By Mr. CHARES WALDEYER, of Cherokee, Butte County, California, in Prof. RAYMOND'S Report on the Mineral Resources West of the Rocky Mountains, 1873.

† Mr. WALDEYER'S description of the blue lead is contradicted by some other observers, who say that the blue color of the lower deposits of auriferous gravel is due to the existence of protosulphides and protoxides of iron, which change on exposure to the air, turning red. They say, also, that the lime separating these two colors in the deposit is not one of regular stratification, but irregular, and dependent upon the access of oxidizing agencies. Also, that the bowlders of the blue lead become "rotten" by exposure.—R. W. R.

ments and the mining-ground at command. Much can be done by the consolidation of different interests. A plat of hydraulic mining-ground, representing from eighty to two hundred acres, constitutes a security for any capital which can legitimately be employed in its improvement.

Location of Tunnel.—This should be low enough to work the whole body of mining-ground. If the depth of the channel can be ascertained by shaft or incline it will be the best policy to do so; if, however, too many difficulties, such as quicksand, or too great a depth of ground, interfere,* it will be better to choose at once the *lowest point* attainable for a tunnel, always, however, with due regard to sufficient fall from the mouth of the tunnel for a long line of sluice-boxes, with under-currents, dumps, etc.

In choosing this starting-point for a tunnel, not only the probable depth of the channel must be taken into account, but also the fact that the necessary *grade* of the tunnel, say from 3½ to 4 feet per hundred, will reduce its *depth*, for each additional thousand feet, 35 to 40 feet. Hence, if the extent of the claim to be worked is considerable, say 2000 feet on the channel and 4000 feet across it, and the tunnel, as is generally the case, runs across the channel, it will be necessary to have the tunnel in the middle of the channel, at least 40 feet lower than the bed-rock, or bottom. This is illustrated by the subjoined diagram.

It will be seen that the dotted line toward D E, on the left side, is still somewhat in the bed-rock. This is desirable, not only for the lateral extension of the mine, but also for the reason that sluice-boxes, at a reasonable depth in the bed-rock, always facilitate the work in a hydraulic mine, offering chances for grades in all directions to wash the gravel, etc.

Size of Tunnel.—This must depend to some extent upon the required work, the quantities of water at command, and the length of the season annually during which the water lasts. Tunnels 5 feet wide and 6 feet high were considered in former years sufficiently large for any purpose, but since hydraulic mining has been conducted on a much larger scale the size of tunnels, in height and width, has increased accordingly. They are now generally constructed 7 feet wide and 8 feet high for single runs of flumes or sluice-boxes, and in those mines where there is a sufficient quantity of water for eight or nine months in the year, and where the remaining three or four months can be used for a thorough cleaning up, repairing, etc.

A tunnel of such a size, with a 6-foot flume and 4-foot grade per hundred, would admit the use of 2,000 or 2,500 inches of water; the size of tunnel may be reduced if the supply of water is much less, other conditions being the same. For mines which possess a lasting supply, say 2,500 to 3,000 inches the whole year round, a much larger size would be desirable, admitting a double run of sluice-boxes, and thus an uninterrupted washing.

In former years, the idea of running a tunnel 12 feet wide and 9 feet high might have deterred the boldest; but at the present day, when the diamond drill has come into use, such undertakings can be prosecuted with a comparatively small additional expenditure and no loss in time. It has been found that it takes almost as much time to remove the fragments of stone excavated by the diamond drill as for drilling and blasting; and in consequence, the diamond drill is only employed for half the time in tunnels of limited size. But where, after the blasts are exploded, the drilling-machine can be adjusted again without interfering with the car by which the fragments of rock are removed, a tunnel of double width can be run in the same time.

Grade of the Tunnel.—This depends partly on the quantity of grade to spare. Where there is plenty of fall, a liberal grade, say 6 inches per 12 feet, or about 4 feet per hundred, ought to be given.

More grade in large flumes becomes dangerous for the pavement of the flume; a 6-inch grade will not only carry off any desirable quantity of gravel, etc., but materially assist, by the very rapid motion produced, in the breaking up of the gravel and liberation of gold. Where the fall is more limited the grade may be reduced to 5 inches in 12 feet, or 3½ feet per hundred. Whenever less grade has to be applied, difficulties in the removal of the "pulp," and particularly of larger stones, will arise, and many hands will have to be employed to push the material along.

Line of Tunnel.—This should be perfectly straight wherever practicable, in order to facilitate not only the general flow, but also the measurement and calculation of all those points, the correct location of which is necessary. Underground measurements of curves are for the simple miner extremely difficult; the magnet loses its reliability, being disturbed by the iron in the bed-rocks, and generally a "tapping in the dark" ensues. Due attention to the straight line in the tunnel will avoid all these difficulties, and insure, besides, the shortest distance.

General Considerations.—It is not advisable to open a hydraulic mine too close to the rim-rock. As already remarked, great bodies of quicksand lie close to the rim-rock; moreover, the occurrence of pipe-clay, and perhaps the want of rich "pay gravel," may combine to render the work tedious, unprofitable, and discouraging; and, finally, the mining-ground brought under control will be comparatively insignificant.

The Chimney.—The advisability of extending the tunnel well into the basin before "tapping" the latter cannot be disputed. If a shaft or incline has been sunk to the depth of the channel or basin, the terminus of the tunnel can be decided upon according to the knowledge gained. Whenever this point is reached it will be necessary to pierce the bed-rock intervening between the terminus and the gravel-deposit in the channel, by a "chimney"—either a vertical shaft or a slope. This chimney must be started in such a direction as to strike the bottom of the shaft or incline. Should water have collected in the latter it must be removed by pumping before a connection is made.* Want of care in this matter has caused much lamentable loss of life.

Chimney Without Shaft.—Should, however, no shaft or incline exist, and should the condition of the gravel-bed overhead be unknown, the greatest care must be taken in making the attempt to break through.

As before remarked, great bodies of sand lie in the sloping rim-rock, before the solid bottom gravel is reached. This sand is in connection with loose gravel-deposits overhead, and becomes *quick* under the great pressure of water which always exists in deep gravel-deposits. Whenever these sand-patches are entered without the greatest precaution, immense rushes of water, sand, and loose gravel will occur, filling often the largest tunnels in a few minutes. There are cases on record where the labor of two or three years was lost, the greatest portion of the tunnel being necessarily abandoned, and a new direction, to the right or left, pursued. When, therefore, the attempt is made to run up a chimney from the terminus of the tunnel into the unexplored channel above, the work should be commenced to the right or left of the terminus, and be continued on a convenient slope. The experienced miner will know, whenever the water increases in the seams of the rock, or when the seams turn yellow, or the rock changes to a softer stratum, that the basin or channel may be only a short distance above. When these signs occur, it is advisable to drill a hole far enough to test the thickness of the rock intervening between the chimney and the channel. Should the drill pierce the rock, it is easy to insert a thinner and longer iron rod to feel the deposit above the bed-rock. If hard gravel is struck all will be safe, and the chimney can be continued without any apprehension; but if water and sand are found, and the iron rod enters readily for 5 or 6 feet, it will better to abandon the chimney at once, and continue the tunnel. The presence of sand and water, or quicksand, indicates that the depth of the channel is not reached, and that the most valuable gravel-deposits lie deeper, and at the same time forewarns the miner of a great danger, a rush of quicksand and loose gravel.

The chimney, if hard gravel is reached, should be continued, as before stated, on a slope, as in this way the work can be more safely done than in a vertical shaft. This consideration may be of little importance, so long as the ground is hard and strong, but in softer strata, surcharged with water, a slope offers the only chance to proceed with safety to a certain point. When this point is reached and further progress is barred, it is best to secure the terminus of the chimney in such a way that the water can drain off, without giving the sand, or loose gravel, a chance to run. After this a careful survey must be made to ascertain the exact spot where a shaft from the surface down will strike the terminus of the chimney. This is an easy matter when the tunnel is straight.

Shaft.—A shaft with square section, (say 4 by 4 feet,) to permit timbering, must be commenced and worked down in the usual way, as far as circumstances will permit. If the drainage established through the chimney is sufficient to free the shaft from water, it will be comparatively easy to go through sand and gravel and connect shaft and chimney; but if this drainage cannot be established, or is not adequate, even with the additional hoisting of the water by windlass and buckets, it is best to procure an artesian borer, and to make thus a connection between the bottom of the shaft and the chimney. (The character of the ground excluding the existence of large pebbles or bowlders, an artesian borer can be used to good advantage.) After this the shaft can be brought down, but must be secured firmly against side pressure by good framing and planking.

First Washing.—The connection once made between shaft and chimney, sluice-boxes may be laid through the tunnel, and the first washing of "dirt" may commence. This begins by removing the upper sections of timber out of the shaft, widening its mouth by pick, shovel and water, and tumbling and running the "dirt" and water into it, always, however, taking care not to choke the shaft or chimney. This process is continued downward, in the shape of steps, or terraces, as security against cavings or slides. It must depend on the depth of the shaft, as well as on the greater or less safety of the ground, whether a larger or smaller opening of the shaft is to be made, since dangerous cavings may occur in spite of all precaution. In this way an opening must be made to permit the use of water under pressure. It must be left to the manager of the mine to shape this chimney in such a way that an easy and uninterrupted discharge in the sluice-boxes is secured.

If the main tunnel is to be continued further it will be necessary to leave enough space between the starting-point of the chimney and the face of the tunnel to admit blasting operations. At the same time precautions ought to be taken to protect the blasters in the tunnel from any accident arising from the possible blockade of the sluice-boxes or tunnel, and the only safe expedient will be to have not only a strong barrier between the blasters and the sluice-boxes, but also to have an independent way for ingress and egress. This may be secured by widening the chimney sufficiently to admit a strong water-proof box with a ladder, by which means the miner can reach the surface of the ground, without interference from either the washings or cavings of the gravel from above, or any blockade in the tunnel below.

It will be seen that the existence of a shaft or incline, before the connection between the terminus of the tunnel and the basin or channel, is of great importance. If an incline exists, great facilities are offered to employ hydrostatic power from the lower part of the incline, as soon as a moderate opening is made to the surface.

* In speaking of the difficulties connected with the sinking of shafts or inclines it will be proper to mention here that it took over four years in time and $75,000 in money to sink an incline on one of the great gravel "leads" in California, owing partly to ridges of hard rock rising in waves on the sloping rim, but chiefly to beds of quicksand and loose gravel lying on the sloping rim-rock, and bursting here and there through the "face" under immense pressure, throwing from time to time as many as a thousand car-loads into the excavated part of the incline. However, the object was accomplished, and the firm bottom strata were reached.

* If proper caution and skill are employed, the connection through bed-rock may be safely made, I think, without pumping out the shaft. The question is one of relative expense. When the diamond drill is employed, a long hole in advance of working would be the only necessary precaution. But in the absence of accurate surveys, and in view of the usual recklessness of miners, Mr. WALDEYER'S declaration, that the shaft should be pumped out, is justifiable.—R. W. R.

TO BE CONTINUED.

HYDRAULIC MINING IN 1872.

A, Und-reurrent; B, Drop; C, Grizzly; D, Distributor

THE ENGINEERING AND MINING JOURNAL.

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RICHARD P. ROTHWELL, C. E., M. E., } Editors.
ROSSITER W. RAYMOND, Ph. D., }

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THE gratifying success which has attended the ENGINEERING AND MINING JOURNAL during the year past, and which has shown itself in a large addition to our subscription list and advertising, has brought with it the necessity for enlarging the paper. Though we have long recognized the necessity of making this addition, the general uncertainty in business made it desirable to postpone to this time the accomplishment of our plans. We now have great pleasure in informing our friendly readers that in future the JOURNAL will contain twenty pages, instead of sixteen, and at no distant day will be still further increased. The more liberal use of engravings, to illustrate subjects of interest, will add to the attractiveness and value of our pages, and subjects of practical importance in mining, metallurgy, and in gas engineering will receive special attention. We trust our friends will reciprocate our efforts to improve by furnishing us even brief notes of whatever of interest takes place in their several districts. We are well aware that it is difficult for engineers, superintendents of works, boss miners, etc., to find time to write out papers for publication ; but it is always possible for them to send us the bare facts, (which can often be given on a postal card,) and where they can add to this, so much the better. We invite them to use our columns in asking for, and giving, information as to the cost of machinery, mine supplies, rates of wages, or prices paid for sinking shafts, driving tunnels, or executing any kind of mining work. The cost of furnaces, of treating ores, the condition and prospects of mines or furnaces, etc., etc. ; in short, we desire to have our paper used as a medium for asking and giving information, on subjects connected with mining and metallurgy or general science. There are few of our readers who cannot contribute something to the general fund, and where, through lack of time or other cause, they are unable to write us finished papers, we invite them to communicate even in the briefest manner the points they have, and we will not only put them in shape for publication, but we can frequently supplement them by kindred information of interest.

Iron Ores for the Centennial.

WE have received from the office of the American Iron and Steel Association a paper ominously headed "Circular No. 3." Who is responsible for this unhappy reminder of Circulars 1 and 2, we do not know ; but whoever did it, committed a great blunder. To allude to the past in this matter is to quench hope for the future. Since the specter has been raised, however, we may as well contemplate it calmly, before consigning it again to that oblivion which covers so many of the achievements of the American Iron and Steel Association.

In January 1874, a long and exceedingly stately article in the *Bulletin* announced what had been hatched up to that time, by three months of incubation. There was a new suite of rooms and a full-fledged Scientific Commission, consisting of the following gentlemen, each of whom had "in writing" expressed his willingness to serve upon it : namely, Professors LESLEY, GENTH, FRAZER, DROWN, PRIME, HUNT, and COOK, and Messrs. COXE, BRITTON, CRESSON, BAYLIS, PETER and RAYMOND. The article said : "The Association not claiming to be a scientific body, it was at once conceded that the co-operation of leading geologists and metallurgical chemists would be necessary to secure the complete success of the undertaking." Hence this commission, the members of which were not to receive remuneration for their services.

But Circular No. 3 says that this plan was abandoned, owing in part to the extreme depression of the iron business, and in part to doubts whether, after the refusal of Congress to make an apropriation in its behalf, there would be an exhibition. The latter ground no longer exists ; and the former is a strange one to urge as the reason for declining the co-operation which was pronounced "necessary" before. Pray, what has become of the gentlemen who signified in writing their willingness to serve? Have they been notified in writing that their services are not needed? Several of them have resigned—one, Mr. J. BLODGETT BRITTON, after a sharp correspondence with Mr. Secretary SWANK, who besought him in vain to "hold on" until some further action should be taken by the Association. Mr. BRITTON, being a Philadelphian, seems to have perceived more clearly than those residing at a distance, the way things were going ; and could not be cajoled into "holding on," for the mere pleasure of being snubbed. Most of the scientific commission "held on ;" and Circular No. 3 is their reward. They are neither thanked nor discharged, but simply ignored, or, at most, informed by intimation that owing to the depression in the iron trade, they have been abandoned.

The Editor of this Journal happens to have been one of the "abandoned" lot, who "signified in writing," etc. etc., and never having resigned, he is still a member of the commission charged with the duty of advising without remuneration. Undeterred by the depression in the iron business, he purposes to discharge that duty now ; and the first advice he gives (free of expense, gentlemen of the Association ; don't tremble about the bill !) is this :

Before asking any more co-operation from "leading geologists and chemical metallurgists," issue another circular, informing the members of the alleged Scientific Commission that, in spite of appearances, you do know what courtesy requires, and that, but for the depression in the iron trade, you would have thanked them for acceding to your former request. And then proceed to thank them in advance for future favors, lest you should again become so depressed as to forget to do it.

Moreover, take the names of Mr. DANIEL J. MORRELL and Mr. JOSEPH WHARTON from your new committee. The former of these gentlemen is universally credited with the ill-success of your undertaking thus far ; and it was he who introduced to the company at the BELL dinner, in Philadelphia, his colleague, Mr. WHARTON, (not one of the expected speakers,) who proceeded to insult the guests of that occasion, and to bore the rest, with a set address that made everybody either furious or sleepy. And Mr. WHARTON, having an opportunity, a few days later, at Bethlehem, to atone for his blunder and offense, repeated both, to the amusement of the English visitors and the wrath of their American entertainers. MORRELL and WHARTON are not fit for a Centennial Committee until they learn how to be mannerly to strangers.

Nor are these gentlemen likely to do justice to the work they now undertake to represent. Messrs. W. E. C. COXE and WILLIAM FIRMSTONE, of the Committee, are first-rate men for the purpose. Messrs. ANDREW CARNEGIE and JAMES I. BENNETT will do very well. But MORRELL and WHARTON will smother the whole thing again, if they are permitted to do so. If, for instance, Tennessee, Alabama, West Virginia, the Hocking Valley, or the Connellsville region, should offer specimens and statements of cost, showing that they can produce iron far more cheaply than Johnstown, or even that they could get along without the increased tariff, what would MORRELL do? According to Circular No. 3, he wants to use this opportunity to impress upon "our fellow-citizens who are not interested in iron the immense importance in this industry, *and the consequent necessity of promoting its welfare by wise legislation.*" It is not difficult to account for the milk in *that* cocoanut !

Give us better proof of your good faith, gentlemen, and we will go in and help you, even at the eleventh hour ! If not, not. *

The Poorman Mine.

THE once celebrated Poorman mine, near Silver City, Idaho, which has been lying idle for several years, is, according to the Owyhee *Avalanche*, again being worked.

The claim was located in 1854, and early the following year passed into the hands of a New York Company, who built a mill and worked the mine very successfully for three years.

New Yorkers, at that time interested in mining, will probably recollect the exhibition of the ores from this mine at Trinity Building in 1865. There were several tons of large and solid lumps of ruby silver, such as had probably never before been taken from any mine. But in time this ore-body, from which the company drew such large amounts of silver, threatened to give out, the ores grew poorer, the hoisting machinery became inadequate, and it was plain, that the necessary explorations ahead of the regular extraction would require capital and courage. Then the company, with the despondency, under such circumstances characteristic of Eastern capitalists, gave up business and the mine remained idle

until towards the end of 1874, when it was bought by a San Francisco company. Pacific coast capitalists entertain notions of mining quite different from those of the East. They have profited by experience, and in their estimation of the value and character of veins, approach very near the reality. If anything is to be commended in their manner of mining, it is the tenacity of purpose and the courage with which they try to accomplish their end, i.e., bring their mines up to a dividend-paying basis. The operations on the Comstock vein, and in many outside districts, notably in California, during the last year, give unmistakable testimony in this direction.

The new owners of the Poorman have erected one of BOOTH'S engines, having a 14 inch cylinder and 30 inch stroke, and are deepening the perpendicular main shaft, 9 feet 6 inches, by 8 feet 9 inches, which is now 340 feet deep, by means of a Burleigh drill, which is doing good work in the hard granite. The shaft is expected to strike the vein at the depth of 700 feet.

There is also a tunnel being run on the vein, 90 feet below the deepest old workings. This tunnel commences at the south end of the company's ground, 800 feet from the hoisting works, which are on the center of the claim. The vein in the tunnel is three feet wide, and produces ore averaging $75 per ton, which is rich enough to pay large profits, provided a considerable body of it can be found.

Quick Work Opening a Mine.

THE time necessary to open a mine and bring it into a productive condition, must necessarily vary with a variety of conditions. In our anthracite mines, from one to two years is usually required, and when the shafts are very deep, this limit may be extended to three or four years. In all cases, economy requires that the work should be pushed with the utmost energy; and as a sample of what may be done under such circumstances, we give the following notes of progress at the Port Bowkly shaft of the Riverside Coal Company, near Wilkes-Barre, Pa.:

The shaft is rectangular, 10×20 feet, and is 251 feet deep. Sinking was commenced 15th of December, 1873, and it was finished 15th of April, 1874, or in four months. The second shaft required by law was made circular, 12 feet in diameter, and is 236 feet deep. It was commenced 20th of April, 1874, and was completed 18th of July, or in less than three months—the work in each case being done by hand drilling. The rock is generally micaceous sandstone and shales, with a few heavy beds of very hard sandstone. The shafts required no timbering, except for holding the guides.

During July and August, 1874.....	3,121	tons of	coal	were mined.
" September.....	3,663	"	"	"
" October.....	11,299	"	"	"
" November.....	11,122	"	"	"
" December.....	17,156	"	"	"
Total.....	46,361	tons		

mined within one year (12½ months) from the time sinking was first commenced. In 20½ days of January, 1875, 17,500 tons were mined, showing a steady increase in the output.

The cost of sinking was very low—the contract price for the first shaft being about $175 per yard, and that for the second scarcely more than $110 per yard. The contractor, Mr. WM. MCCULLOCH, to whom great credit is due for this remarkable work in shaft sinking, is understood to have done well at about these figures. The mine "boss" in charge of getting the coal was Mr. JENKIN B. JONES, an experienced and energetic miner.

The "breaker" at this mine having been built many years ago, it became necessary to rebuild it. This was done with such excellent management—the new frame having been all prepared before stopping the old breaker—that the entire time lost in rebuilding was twenty-nine days. When it is considered that a "breaker" of this kind contains from 300,000 to 400,000 feet of lumber, and requires, with energetic work, four months to build, this must be considered as quick work. The energy with which work at the mines of this company is pushed, under the able management of the President of the company, Mr. J. H. SWOYER, and his efficient lieutenant, Mr. CHARLES LEONARD, might well serve as a model for colliery managers elsewhere.

If any of our readers know of an instance of equal dispatch in opening a colliery as this, we shall be pleased to hear from them.

The Hudson River Tunnel and Quick Transit.

THE project for connecting New York and Jersey City by means of a tunnel is attracting, as it deserves, great attention; in fact, it is doing double duty, for the prospect of having quick and reliable transit to the New Jersey shore is moving our citizens who are largely interested in property on the upper part of the Island to secure rapid transit at once in that direction, and thus forestall New Jersey.

So long as such men as A. T. STEWART and Commodore VANDERBILT found their interests lay in defeating any plan of rapid transit, there was great difficulty in securing this much longed-for boon; but now that the question is between New York and New Jersey and Brooklyn, and that there is a fair prospect of a tunnel being driven under the Hudson, property owners up-town are becoming alarmed, and are insisting on having something better than these abominations called "horse cars," which our necessities alone make endurable.

The narrow, selfish policy that has so long deprived this great city of quick transit to the North is endeavoring to prevent the building of the Hudson River Tunnel, but we hope unsuccessfully. Work which was commenced on the tunnel is for the moment interrupted by legal proceedings, but legislation is now being sought to enable the companies to carry on the work, and provide cheap homes for our middle and lower classes. If there be any one thing in which New York is behind our other large cities, and which is doing her incalculable injury, it is that we have no cheap and quick transit from our workshops to the surrounding country where the laboring classes, and people of small income, can enjoy the healthfulness and pleasure of fresh air and comfortable homes. New York is *par excellence* the city of the very rich and the very poor. The former live in a style and with a luxury unthought of in any other part of the country, and the very poor are huddled together in the pest breeding tenements of the city, where they spend, for the most miserable shelter imaginable, a sum that should provide them healthy and comfortable homes in the country, had they the means of ingress and egress at a moderate expenditure of time and money. Our middle classes follow a most uncomfortable and demoralizing kind of Arab life among our boarding houses, while with the surrounding country brought near by quick transit, they would live far more comfortably and economically in the suburbs.

We look upon rapid transit as the most important project for the general benefit of New York that is now before the public, and we shall favor any honest plan for securing it.

The present status of the Hudson River Tunnel is as described in the following extract from the *Iron Age:*

"The purpose is to construct a tunnel from Jersey Avenue, Jersey City, under Fifteenth street to the river, then under the river bed to the foot of Christopher street, New York, and thence to its projected eastern terminus at Broadway and Tenth street. The work is to be done under the supervision of two companies—one in New York with a capital of $7,000,000, and another in New Jersey with a capital of $3,000,000, making a total capital of $10,000,000. Articles of association were filed in the office of the Secretary of State, of New York, under the general railroad law, on the 22nd day of May, 1873. Four days later the articles of association were filed with the Secretary of State of New Jersey, under the general railroad law, passed by the New Jersey Legislature early in 1873. The companies thus organized acquired from the city of Jersey City permission to sink a shaft at the foot of Fifteenth street, Jersey City, and in October, 1874, commenced operations about 100 feet from the edge of the water. The shaft, about 30 feet in diameter, is to be 65 feet deep. The laborers had worked upon it for 23 days, and had dug to a depth of about 20 feet, when further progress of the work was stopped by an injunction issued by Chancellor RUNYON, at the instance of the Delaware, Lackawanna and Western Railroad, who claimed the ground upon which operations had been commenced. The Chancellor's order precludes the company from going on with the work until they shall have made compensation to the owners of lands they propose to traverse. The company claim to have been ready and willing, at all times, to remunerate the railroad company for the lands they had taken, and made application soon afterward for the appointment of Commissioners to condemn and assess the values of lands taken by the company. This application was resisted by the railroad company, on the ground that the tunnel company is not a railroad company, and had no right to organize under the general railroad law. Judge DUPUE appointed the Commissioners, but deemed the question so close a one that he immediately certiorariied the question to the Supreme Court for decision. In order to dispose of whatever questions may arise under the general railroad law, Mr. WHITE has procured the introduction, into the Legislature, of a bill amending the general railroad law so as to allow a railroad constructed in a tunnel beneath the surface of the ground to pass under the land of other railroad corporations, provided that the road so constructed underneath the surface, shall be fifteen feet below the surface, and in no way interfere with any necessary use of such land, by the corporation owning the same, for the purposes of their franchises. The bill also provides for the proper condemnation of the land necessary for the construction of such underground railroad. The proposed amendment, while introduced at the instance of the Hudson River Tunnel Company, will accrue to the benefit of any company who may hereafter see fit to embark in a similar undertaking.

"The tunnel upon which work has been thus commenced is to be 24 feet high and 26 feet wide, inside measurement. At the water's edge, on the Jersey shore, it is to be about 35 feet below the surface, and at the point where it will strike the New York city shore line it will be 45 feet below. When it shall have been finished it is to be fitted up with double tracks, and trains will be run over them at regular intervals for the accommodation of passengers. Flat cars are to be provided for the transportation of horses and wagons and other vehicles, and much of the freight from the great railway companies who own the shore front will be transported through it. Its wall is to be of brick, and will be three feet in thickness.

"When the river shall have been reached, it is proposed to carry it on to completion by the construction of what, in tunnel architecture, are known as 'locks'—air-tight passages, in which the pressure of the air will be sufficient to resist the pressure from the outside—until the walls shall have been completed. The excavation is to be accomplished through the agency of an air-tight tube. The pressure of the air is expected to remove all the earth taken from the tunnel with the rapidity with which fifteen men could shovel it into cars, and it is to be carried by the same natural agent, through a tube, to the surface, thus saving the expense of laborers and of transportation upon cars."

NEW PUBLICATIONS.

THE AMERICAN CYCLOPÆDIA—Vol. X. New York, D. APPLETON & Co.

THE tenth volume of this work shows no falling off in the care and judgement bestowed on its preparation. At the same time, the number of new articles on subjects directly interesting to this Journal, is smaller than in some preceding volumes. We note as the most important an admirable article on Lead from the accomplished pen of Prof. DROWN, of Lafayette College. The chemistry and metallurgy of lead are here brought down to the most recent period, and the subject is treated with such clearness, fullness and system as to render the article valuable even to experts, as well as extremely interesting to the general reader. Prof. STERRY HUNT contributes to this volume only a couple of biographical notices, of LESLEY and LOGAN, which are noteworthy for saying a great deal in few words. Dr. C. L. HOGEBOOM furnishes an elaborate and satisfactory illustrated

article on Light, and Mr. ROSSITER JOHNSON an account of Lake Dwellings, tantalizing in its brevity, but furnishing an outline of this attractive subject, and a judicious list of authorities for consultation. We must mention with praise also the articles on the Law of Nations, and the Latin Language and Literature.

*

Wages in the Anthracite Region.

WE have received the following letter from Mr. C. BEN JOHNSON, the editor of *The Workingman*, and the doughty champion of the Miners' Union. We have pleasure in giving his view of the case; for though we may not, in all cases, agree with the policy of the Miners' and Laborers' Benevolent Association, we are far from intending to do any injustice to the men. Next week we shall make some further remarks on the subject, and we thank our correspondent for the information he has supplied in the enclosures referred to by him.

While we deprecate strikes as usually unwise and disastrous to all concerned, and as relics of barbarism, unworthy the intelligence of the present age, we by no means think the fault is always on the part of the men. And, in the present instance, both parties are at fault—the men in insisting on the same wages as were paid before the general decline in values of the past year, the companies in calling on the men to accept less, and then insisting on the public paying almost as high prices as before for the coal.

POTTSVILLE, PA., March 8, 1875.

TO THE EDITOR: SIR—I notice in your issue of March 6, which is just at hand, an editorial on "The Labor Question in the Anthracite Regions," which does the miners gross injustice. I enclose you an address, recently sent out, which will show you that:

1st. The reduction offered by the companies is not 10 or 15 per cent., but 30 and 40 per cent.

2d. That the wages heretofore paid in these mining regions have not been higher than those paid elsewhere for labor requiring less skill and of less hazardous a character.

3d. That the companies, in combining to reduce wages, are not doing it for the purpose of cheapening coal, but for the purpose of wiping out the Union organizations, and, as you yourself recently said, with the aim of making a small output pay a large profit on a large investment in coal lands which are not being developed, or likely to be for years to come.

I also enclose you some resolutions, which will show you what the Union thinks of, and does concerning, those who break the law in its name.

The miners of Pennsylvania don't want anything more than simple justice, but in your editorial you don't by any means concede them that.

The only two "outrages" reported since the beginning of the "lock-out" are the two referred to in the enclosed newspaper slips. C. BEN JOHNSON.

The After-Damp of Explosions in Coal-Mines.

By Mr. J. W. THOMAS, Cardiff.

THE causes of explosions in coal-mines, and the best method of preventing the occurrence, have been made the subject of careful consideration and investigation, and the mining world has long ago come to the conclusion that efficient ventilation is the only safeguard and prevention. Still, explosions happen, and probably will happen, and the best ventilated colliery is not absolutely proof against them.

This has been repeatedly brought forward by eminent mining authorities, who have shown that any working portion of a mine may become almost instantaneously filled with an explosive mixture, derived from sources over which there is often little control—as, for instance, by the sudden outburst of gas from a strong blower—and that such mixture may, unfortunately, be fired under unforeseen circumstances.

It must not be inferred from these remarks that all collieries are liable to become filled with explosive mixtures, and the above observation applies, in fact, only to those collieries which are situated in the fiery, or marsh-gas zone, as it is sometimes termed, of the North of England and of the South Wales basins.

Much has been done of late to ensure a thorough practical and scientific system of ventilation, and the various, as well as ingenious, methods devised for the purpose of conveying, regulating, dispersing, and dividing the currents of air, are a sufficient proof of the attention which has been bestowed upon this branch of mining.

It is somewhat strange, however, that up to the present time there is no work on mining which gives any insight into what actually transpires at the moment of explosion; and our knowledge of the products of combustion, and of the conditions under which an explosion takes place, as well as of the limits of an explosive mixture, is far from being perfect.

It is true such knowledge would not materially aid us in preventing the occurence of explosions. The frightful loss of life which they entail should, however, of itself awaken a desire to make ourselves acquainted with the conditions under which death ensues, whether by burning, suffocation, or other cause, and, if possible, to devise some methods of reaching the sufferers who, untouched by the ignited marsh-gas, are nevertheless doomed to death from the effects of the products of combustion.

Tables have been constructed by able mining authorities, showing the proportion of air required by marsh-gas for its complete combustion. Theoretically this is a matter of no difficulty, since twice its volume of oxygen is the necessary quantity. And as atmospheric air contains 20·88 per cent., or rather more than one-fifth of its volume, the requisite amount of oxygen for the complete combustion of one part of marsh-gas will consquently be furnished by 9·5 parts of air. It is also easy to tabulate the ultimate products of the combustion of this mixture, viz., carbonic acid, and nitrogen. But to lay down a rule wherefrom to calculate the percentage composition of the resulting products of an explosion in a mine, and to point out that a given number of parts of air and marsh-gas give rise to the most severe or deadly explosion, must evidently appear fallacious. Tables of this kind have been published, and are used by colliery officers. But to arrive at something like a correct idea, we must take into consideration what practically happens when an explosion takes place.

It is evident that, previous to an explosion in a single heading, gallery or galleries, there exist at the time—in the field of such explosion—marsh-gas and air mixed *in every proportion*; varying from one part of fire-damp to ninety-nine parts of air, or from ninety-nine parts of fire-damp to one part of air. There will be found, in fact, mixtures of these gases in proportions in which they will readily explode, as well as in proportions in which they do not explode.

It is difficult to define the limits within which a mixture of these gases remains inexplosive when in contact with a readily explosive atmosphere which, by some accident, may be fired. From the experiments of DAVY, HENRY, BISCHOF, and other eminent authorities, we are well acquainted with the theoretical proportions of marsh-gas and air which will cause an explosion, or ignite under ordinary conditions of temperature, etc., in a mine, provided that the fire-damp consisted entirely of marsh-gas.

As experiments performed in the laboratory are almost invariably carried on with pure marsh-gas, the results are probably higher than those which would be obtained from fire-damp; for, marsh gas, either when evolved from the working-face of coal, or from blowers, seldom exceeds more than 97 per cent. of the volume so given off.

It has already been stated that when 9·5 parts of air are mixed and exploded with one part of marsh-gas, the whole of the oxygen present is consumed, carbonic acid and water being formed.

Owing to the strong currents of ventilation passing through a mine, the air is, however, always charged with floating particles of coal, incident upon the process of working; coal ground into fine powder by the wheels of the trams, horses' feet, etc. Hence, it is conceivable that very little oxygen may be left unconsumed, even if thirteen parts of air be mixed with one part of fire-damp, which is probably the theoretical explosive limit of a mixture of fire-damp with air.

DAVY's experiments proved that mixtures of marsh gas with air do explode, even if the oxygen present be insufficient for complete combustion; and he has left it on record that when one part of this gas, mixed with six parts of air, was exploded by an intense electric spark, an expansion of volume resulted. Up to the present time it has been taken for granted that mixtures of marsh-gas with less than 9·5 parts of air will explode, and that carbonic acid and water are formed, as much of the hydrocarbon being broken up as the oxygen will allow, the excess remaining unaltered.

Doubting the correctness of this generally accepted creed, and guided by the results of DAVY, I was led to make some experiments, in June last, in the gas laboratory of the Royal College of Chemistry, South Kensington, upon a sample of gas which, upon analysis, was found to contain 97 per cent. of marsh-gas, and I observed that a totally different reaction occurred.

Being engaged at the time, however, in a series of experiments on the gas enclosed in coals from the South Wales basin, I postponed the further investigation for some furture occasion. In the meantime, Dr. MEYER, a German chemist, has published in the November number (1874) of the *Journal für Practische Chemie* the results of his investigation of this hydrocarbon, as well as of acetylene and hydride of ethyl when mixed and exploded with oxygen in proportions for incomplete combustion.

The results obtained by MEYER agree in all respects with those I had found, and the law which he deduces is entirely borne out by my experiments. MEYER gives the data of two analyses, which show that when marsh-gas is mixed and exploded with oxygen in equal proportions, as well as in the proportion of eight of the former to nine of the latter, the whole of the hydrocarbon is broken up, and carbonic acid, water, carbonic oxide and hydrogen are formed; and he concludes that, in all cases of incomplete combustion, marsh-gas is nevertheless entirely broken up, and that, if mixed and exploded with half its volume of oxygen, carbonic oxide and free hydrogen only are formed. I have found, however, that marsh-gas mixed with half its volume of oxygen does not readily explode. The experiments which I made with larger volumes of oxygen, such as mixtures containing fifteen and seventeen parts respectively, with ten of marsh-gas, conformed likewise to this observation, viz., that the whole of the carbon of the marsh-gas combines with oxygen to form carbonic oxide and carbonic acid, while the affinity of the hydrogen for the oxygen increases, more or less, according to the quantity of oxygen present.

A general opinion has hitherto prevailed among chemists that the affinity with which hydrogen combines with oxygen to form water is quite equal, if not superior, to that of carbon to form carbonic oxide or carbonic acid. BUNSEN has shown that when a mixture of carbonic oxide and hydrogen was exploded with a quantity of oxygen insufficient for complete combustion, equal proportions of these gases were respectively converted into carbonic acid and water. This is not the case, however, with marsh-gas, as from the preceding and following experiments the superior combining affinity of the carbon over that of the hydrogen of the marsh-gas will be clearly shown.

Still the relative affinities of these gases do not remain constant, as the following experimental deductions illustrate :

1. When the proportion of the oxygen in a mixture does not exceed half the volume of the hydrocarbon, no hydrogen is consumed on explosion ; the residual gases consist of carbonic oxide and hydrogen, the latter gas occupying twice the volume of the former.

2. The superior affinity of carbon manifests itself when ten parts of marsh-gas are exploded with seventeen parts of oxygen, as the remaining gases contain *some* hydrogen, while the *whole* of the carbon combines with oxygen to form carbonic acid and carbonic oxide.

3. When the oxygen mixed with marsh-gas *nearly* reaches the proportion of two parts of the former to one of the latter—which is the requisite amount for complete combustion—the *whole* of the hydrogen is transformed into water, while twice as much carbonic oxide remains as will correspond to the deficiency of oxygen.

From the results of numerous experiments it would appear, then, that when marsh-gas is ignited in a mine with 4 5 times its volume of air, only 10 per cent. of its carbon form carbonic acid and 90 per cent. carbonic oxide ; a little hydrogen at the same time being converted into water, while the greater part remains free ; and it is highly probable under the favorable conditions of temperature, &c., which exist at the moment of explosion, that large volumes of marsh-gas when mixed with small proportions of air—say three parts, for instance—are entirely broken up into carbonic oxide and free hydrogen.

With five volumes of air the carbon of the marsh-gas forms 13 per cent. of carbonic acid and 87 per cent. of carbonic oxide. With six volumes of air about 20 per cent. of carbonic acid and 80 per cent. of carbonic oxide, the latter gas decreasing as the oxygen increases, until with 9.5 parts of air, carbonic acid and water only would be formed, if it were not that the floating particles of coal, ignited by the flame passing through the explosive mixture, consumed a portion of the oxygen. The volume of carbonic oxide generated during an explosion must therefore be very considerable, especially when the percentage of marsh-gas is high.

Hydrogen gas in large quantity is also liberated, as every volume of marsh-gas which is broken up sets free twice its volume of hydrogen. Only a small portion of this is converted into water, when the oxygen present does not much exceed half the volume of the marsh-gas. When twelve volumes of this gas are exploded with twenty volumes of oxygen nearly the whole of the hydrogen is consumed, the residual gases consisting for the most part of carbonic acid and carbonic oxide.

It will be observed that the larger the bulk of marsh-gas which is mixed with less than 9½ parts of air, the more serious will be the results of the after-damp, and it is probable that after every explosion the remaining gases contain as much, or even more, than 3 per cent. of carbonic oxide in that portion of the mine which is filled by the ignited gases. Diffusion and air-currents carry this poisonous mixture throughout the mine, and fill the main galleries leading to the mouth of the down-cast shaft, thus cutting off every chance of escape, unless the main airways remain undamaged, and the ventilation unimpaired.

The fatal effects produced by after-damp have long been an enigma to practical miners. It may readily be understood that the force of an explosion is tremendously powerful, as is proved by the after-appearance of that part of the mine where the explosion happened. It can also be imagined that the unfortunate miners, in, and proximate to, the ignited mixture, have little chance of escape, the carbonic acid which is formed, together with the nitrogen which is left, being sufficient, in the absence of oxygen, to finish by suffocation the deadly work which the fire and force of the explosion have begun.

But it is too well known that the fatal effects of the after-damp are not confined to the galleries or headings in that part of the mine where the explosion took place, but also that very many lives are constantly lost in such parts of a mine as are far removed from the scene of the explosion, and in such parts also where, in spite of the explosive force, which crushes and blows down the doors used for dividing the ventilating currents, much air will have been mixed with the products of combustion so as to dilute them. It has often been observed by parties who have descended in search of the victims that the lamps carried down with them still continued to burn brightly, while many of the explorers have fallen insensible, and have been borne back with difficulty by their comrades. We have also instances recorded of dead bodies being found after an explosion with lamps burning brightly by their side.

Hitherto, carbonic acid, even when mixed with much air, has been looked upon as the cause of the fatal effects produced ; but is carbonic acid really poisonous? Carbonic oxide, we know, is poisonous in the highest degree, and 1 per cent. of this gas is sufficient to cause death, when breathed for a very short time even.

LEBLANC published in the "*Annales de Chimie et de Physique*" some very interesting and valuable experiments upon this gas ; and the following two examples, taken from the above publication, will, I believe, be quite sufficient to show how probable it is that the fatal effects produced in the instances above related were caused almost entirely by carbonic oxide. An atmosphere generated by burning charcoal in a close room was found on analysis to contain .54 per cent. of carbonic oxide, 4 61 per cent. of carbonic acid, 19.19 per cent. of oxygen, and 75 66 per cent. of nitrogen. A dog which was kept in, and compelled to breathe, this mixture died in twenty-five minutes from the time when the charcoal was ignited, whereas a dog survived which had been shut up for three-quarters of an hour in a mixture of carbonic acid and air, containing no less than 30 per cent. of the former, when he was removed at the expiration of the above time.—*Iron.*

On a New Process for Preserving Wood from Fire and Decay.

By S. W. MOORE.

IT has been the endeavor of chemists for some long time to discover a means whereby wood could be preserved from decay and protected from fire without increasing its cost or otherwise materially altering its general properties.

The following process, devised by Mr. WEATHERBY and investigated by myself, seems to be one which shall meet these demands to a remarkable degree :—

The wood to be prepared is kiln-dried, which process deprives it of all moisture and much of its volatile turpentine and other inflammable matter ; it is then put into suitable cylinders, in which lime and water with sulphurous acid gas are forced into the pores of the wood under considerable pressure, the sulphurous acid being a by-product from the wasting of pyrites.

The wood is removed and dried, and is then ready for use.

When sulphurous acid is passed into lime under pressure, a sulphate of lime is formed which is soluble in water, capable of crystallizing as a bisulphite, which is readily oxidizable and convertible into sulphate of lime or gypsum.

As this is an exceedingly insoluble salt, it is not easily removed, therefore, from the pores of the wood, and not only protects the wood by its presence as a non-conductor of heat, but deoxidizes all matters which are likely to prove objectionable as ferments.

The advantages presented by this wood are that its weight is less, after treatment, than of the same wood before kiln-drying ; a series of pieces gave a mean specific gravity of 0·3501. The process for working is very much cheaper than that of any other yet devised ; it is an admirable means for preventing dry rot and decay from the action of water, as its pores are coated with an insoluble salt ; it thus wears longer and vibrates less than ordinary pine ; it resists the attacks of insects, and from the removal of the volatile inflammable matter, as well as from the introduction of a non-conducting material, it is well able to withstand fire, the interior parts not giving up gaseous matter, which always so readily inflames.

The wood, although answering these ends, contains but little matter foreign to itself.

Woody fibre	87·2
Moisture at 115° C.	8·5
Ash	4·3
	100 0

The idea here presented is much the same as that noticed accidentally in the late Franco-Prussian war ; many houses there were found to have been protected from fire when they were largely built with plaster ; lath and plaster walls were absolutely uninjured by the fire when surrounding parts were destroyed.—*Chemical News, Feb.* 19, 1875.

Manufacture of Heating Gas.

MAY 2nd, 1874, the following patent was granted to Sir FRANCIS C. KNOWLES ; For "Improved manufacture of gas for heating purposes."

This invention relates to the generation of pure or nearly pure carbonic oxide gas, which is effected by the following processes :

In the first, pure carbon is obtained by calcining limestone or chalk, and then converting into carbonic oxide the carbonic acid gas evolved. This gas can be used alone or in mixture for general heating purposes.

In the second method, the black oxide of manganese (called wad) and the fuel—namely, charcoal of wood or of peat, coke, or anthracite coal—are reduced to powder, and having well mixed them in such a proportion as to have the carbon to the free oxygen as nearly as may be in the ratio of six to eight, the mixture is exposed in close retorts to a strong red heat. Carbonic oxide gas is evolved, which is to be led into suitable gasometers. When the retorts are discharged the residual mixture is at once to be thrown into water while hot, in order that the manganese may again take up the oxygen which it has lost. It may thus be used over and over again, with little waste and cost of material.

The third method yields a gas composed of about 75 per cent. of carbonic oxide and 25 per cent. of nitrogen. The fuel (charcoal coke, or anthracite coal) having been reduced to powder as before, is well mixed with pulverized nitrate of soda, previously dried, with which it forms a kind of meal gunpowder, though not in itself explosive. Upon raising this mixture to a low red heat in retorts, it deflagrates, and evolves a mixture of nitrogen, carbonic acid gas, and carbonic oxide. The carbonic acid gas unites with the soda of the nitre to form a carbonate. The carbonic oxide and the nitrogen, in the proportion of about 75 to 25, are set free, and may be collected as usual. It is well to let the fuel be a little in excess of the exact chemical proportion, in order to ensure the absence of carbonic acid gas ; as an intense heat is evolved this is easily done. The residue, carbonate of soda, is very valuable, and more than pays the whole cost of the process. It is free from sulphates and sulphurets, and after lixiviation to free it from any coaly matter, and evaporation to dryness, yields a very pure carbonate of soda.

The proportion of pure carbon to the dried nitre is chemically about one-fourth of its weight ; so that, according to the nature and composition of the fuel, the proportion of the fuel to the nitre is readily determined. This suffices to saturate the soda with carbonic acid, and to furnish the 75 per cent. of carbonic oxide in the gas evolved.

The above gases when burned give out a very intense heat, and they may be easily applied for that purpose, either in domestic use, or in any kind of manufacturing operation, or of metallurgy.

As it may be objected to the use of these gases for domestic purposes, that they have no odor and cannot be detected by smell when they accidentally escape, the inventor prefers, by way of precaution against danger, to use them mixed with gas obtained from peat, which gives a gas of high heating power. About 10 to 20 per cent. of peat gas will have the effect of giving to the compound an empyreumatic odor, not unpleasant, such as to render its escape very perceptible.

In such a mixture, the above gases may be as safely distributed for heating purposes as other gas is at present for lighting.

A gas containing about 60 per cent. by weight of carbonic oxide and 40 per cent. of nitrogen gas may be prepared by putting in a closed cupola alternate layers of limestone or chalk and coke, anthracite coal, or charcoal, and keeping up the combustion of such fuel by means of a fan blast, so regulated that no carbonic acid should be evolved from the upper part of the cupola, the calcined lime being from time to time discharged below by a revolving cylinder with an aperture in the side. The proportions of anthracite would be about one-third the weight of the limestone or chalk, and if coke, in proportion according to its richness in carbon.—*American Gas Light Journal.*

The Pernot Process of Mechanical Puddling.

IN the ENGINEERING AND MINING JOURNAL of the 27th of February we published an illustration of the Pernot Puddling Furnace. We give to-day some interesting details as to its work, and a comparison between it and some of the other mechanical puddlers in use in Europe. No mention is made of the Crampton, which appears, thus far, to be the most successful puddler adopted in England. The principal features of the Crampton resemble the Sellers furnace so closely indeed, that we should not be surprised to learn that it is claimed to infringe on this. The Pernot furnace appears to be doing good work, and is gaining ground in France and Belgium.

AT the meeting of the Society of Civil Engineers (Belgium), on the 6th March 1874, M. MOLINOS made the following interesting communication as to the process of puddling devised by M. PERNOT, manager of the works of Messrs. PETIN GAUDET & Co. :—

The subject of mechanical puddling is one of the most interesting of those connected with iron metallurgy, and especially forces itself on our attention at the present time, in presence of the great difficulty of obtaining good puddlers, and the increase of wages. The solution of the problem has been attempted in two ways; first, by simply substituting for the hand of the workman a sufficiently complicated mechanical arrangement for performing the same work ; and secondly, by the use of oscillating or revolving sole plates, to effect the stirring of the mass of iron, and induce the re-action, by bringing the different portions of the sole plate and its charge successively into contact with the oxidizing flame.

The greater portion of the attempts made on the first-named system fell to the ground when brought into practice ; in the second, one method only can be mentioned as having afforded, unquestionably, practical results ; it is that of Mr. DANKS, who by adapting a new kind of lining, or "fettling," to the rotary furnace of Mr. MENELAUS, has achieved so great a success that several English ironmasters at once set about erecting appliances for giving it a trial.

Messrs. PETIN & GAUDET sent to England two of their engineers for the purpose of making themselves acquainted with the details of the new process. They reported that, although the success is undoubted, and the quality of the iron obtained good, the question of the future economical use of the system is still far from being settled. The following is the opinion given by M. J. PETIN in his report :—

It is well known, even by the publications of Mr. DANKS himself, that the fact of his being able to deal with a large quantity of pig iron at one operation constitutes one of the chief items of the saving effected by his process. Not less than 300 kilogrammes (about 6 cwt.) can be dealt with at a time, and it is found better to take even 500 kilogrammes (about ½ ton) or even more ; this coincides with the expressed opinion of Mr. DANKS, junr.

A single puddle ball of 300 to 500 kilogrammes is then obtained in the Danks furnace, and, notwithstanding all kinds of trials in this direction, no attempt has been successful to divide this mass, of at least 300 kilogrammes, into several puddle balls in the furnace itself.

As these enormous masses could not be shingled by ordinary appliances, it became necessary to seek after other means. A larger steam hammer would not answer the purpose, as the moving of the mass into the required positions by manual labor was out of the question. Mr. DANKS has constructed a squeezer, having an enormous cam, to work the puddle-ball piecemeal, and this appliance performs its office in a satisfactory manner. Notwithstanding its high price, this squeezer would be brought into general use if it solved the question definitely ; but, unfortunately, it only puts off the difficulty.

The puddle-ball, thus squeezed, is not even now suited to the ulterior processes by any of the usual appliances. Its dimensions, 1 metre (3·28 ft.) long, by 3 or 4 decimetres (about 12 or 16 in.) in diameter, prevent its being passed through ordinary rolls for making No. 1 bars, or for being operated upon by the steam hammer. Besides, it has now become too cold for further working, and must be reheated, cut off in lengths according to the present practice, and then hammered. To be able to deal with this immense mass, a set of rolls must be erected as powerful as the squeezer.

It will be seen, then, that there are many difficulties in the way of transforming a puddlery on the old system into one which will embrace the Danks process. New furnaces, the substitution of larger rolls for those now in use, shinglers of 12 tons, and reheating furnaces, would be required.

There is nothing exaggerated in this list ; the case is, however, different in starting new works, like those of the Erimus Iron Company, at Stockton-on-Tees. For twelve puddling furnaces, the following plant has been put up :—

2 cupolas on the Thomas system.
12 Danks furnaces.
2 reheating furnaces.
2 shinglers, each 12 tons.
2 sets of powerful rolls.
1 squeezer on the Danks system.
4 supplementary boilers, on account of the waste heat being insufficient for driving the rolls.

In the case of new works, the expense of the above is only comparative, but when works, already in existence, have to be altered to suit the new process, there is the total loss of the old plant to be added to the erection of the new. The question naturally arises, what would be the cost of production under these circumstances.

It is on account of these difficulties that M. PERNOT sought another solution of the problem, one which would allow of the continued use of the old plant, and preserve the practice of rolling the bloom into No. 1 bars ; for, at ironworks like those of Messrs. PETIN & GAUDET, which turn out, almost exclusively, the finer brands of iron, the practice of selecting and classifying the bars cannot be foregone. M. PERNOT's system is entirely based upon the possibility of puddling by the movement of the sole plate only, without stirring by hand, an improvement achieved by the labors of Mr. DANKS. We will now give a description of the method devised by M. PERNOT.

DESCRIPTION OF THE PROCESS.—Let it be supposed that the sole plate of an ordinary puddling furnace be inclined, so that one-half of it emerges from the charge of pig iron, and that this sole plate revolves on an inclined shaft. It will, of course, be perceived that the sole consists of a circular trough. The portion of the sole plate which emerges from the charge comes into contact with the flame, becomes oxidized, and, after passing under the surface in its rotation, draws the iron up with it in a thin layer, either through the iron adhering to it or by centrifugal force, thus greatly increasing the surface exposed to oxidation. The consequence is that a much more regular and complete stirring of the mass is obtained than is possible by manual effort. As will be seen, the ordinary puddling furnace is only altered so far as its laboratory is concerned.

DESCRIPTION OF THE APPARATUS.—As a blast is used, the ashpit is closed. The bridge, like the sole plate, is inclined. The sole is mounted on a cast-iron carriage, which partakes of its motion ; this carriage permits of the sole being withdrawn from the bottom of the furnace for repairs. The motion is given by an endless screw and screw-wheel. In the permanent furnace, however, which has just been brought into operation, the endless screw has been replaced by a toothed pinion. The shaft is not driven direct ; at present a small engine of rather less than a horse power is employed, but that which is being designed will be of the following dimensions :—

Diameter of cylinder 0·15 meter=nearly 6 in.
Length of stroke... 0·25 meter=nearly 10 in.
Speed..... 100 to 150 revolutions per minute,

in order to cause the furnace to revolve 5 to 6 times a minute.

There is no alteration in the roof or in the door ; it is, therefore, possible, at the end of the operation. to separate the puddle balls as in the old method. The appliances and accessories remain the same, and the same shinglers and rolls will serve. The rotation of the sole plate rather facilitates than otherwise the separation and drawing out of the puddle balls, by bringing in succession each of the portions of the sole in front of the door.

The furnace for trial was erected for a charge of only 300 kilogrammes (about 6 cwt.); but as experience has shown that the operation was performed in a more complete manner by enlarging the sole plate and increasing the charge, the latter was fixed at 400 kilogrammes (about 7½ cwt.), and, subsequently, at 500 kilogrammes (about ½ ton) by enlarging the trough. The size of the furnace will not, however, permit of any greater increase in the charge taking place.

In the furnace, as definitely settled, the sole is designed to contain 800 to 1000 kilogrammes (15 cwt. to 1 ton, roughly) and in all probability it will be found that the operation will be performed in a still more complete manner ; for, the same furnace being preserved, the heat will have increased by the rapidity of the combustion of the carbon and silicon, a phenomenon analogous to that which takes place in the Bessemer converter.

It should be remarked that the quantity is not limited, as in the other furnaces, for as many puddle balls can be turned out as desired, while the Danks furnace turns out a single puddle ball, of a certain weight, to be shingled.

We have already spoken of the results. The iron produced by the Pernot process is superior to that which can be obtained in an ordinary puddling furnace, of which fact numerous trials have given abundant proof. The journals of axles made from this iron have stood a test which could not be borne by those made from the same pig by the old system. [*Testing of the journals of axles, deflection of 25 millimeters* (·984 in.) *without permanent set.*]

The saving effected is worthy of notice, especially, if we consider that all the working, up to the present time, has been nothing more than a series of experiments. The labor has been the same, but the production has sometimes increased nearly two-fold. The consumption of coal, from 16 to 17 hectoliters (1 ton 8 cwt. to 1½ ton) with the old furnaces, is reduced to 12 hectoliters (1 ton) in the treatment of the gray pig. The expense in the matter of scrap iron is scarcely a third what it was before ; the sole becomes but little worn, and is easy to maintain. With the jet of water, which will shortly be tried, this maintenance will be still cheaper.

Lastly, the waste has appreciably diminished. From about 10 per cent., in the case of the old furnaces, it has become as low as 4 per cent., and sometimes

less. The charges of 500 kilogrammes (about ½ ton) give from 480 to 490 kilogrammes (·47 ton to ·48 ton) of iron.

DESCRIPTION OF THE WORKING.—This is the order of the successive operations on first starting the furnace. The riveted plate iron trough is lined or fettled with oxide of iron, obtained from an ordinary puddling furnace, in the form of pieces of scrap iron of different sizes; this first layer is from 5 to 6 centimeters (about 2 to 2⅜ in.) thick.

With this lining, the trough is placed in position by bringing back the carriage, and as good a joint as possible is made between the upper edge and the cast-iron plates supporting the brick coping. It is not, however, absolutely necessary that the joint should be a perfect one, experience having proved that neither the operation, nor the heating of the furnace with the blast, suffers, even if the space left be as great as from 3 to 4 centimeters (1·18 in. to 1·57 in).

When once the furnace is dried and raised to a white heat, scrap iron is melted, as in an ordinary puddling furnace, in order to make good all the joints formed by the pieces of oxide of iron, so as to obtain a united surface without fissure. As soon as the scrap becomes hot, it is melted by air being blown on to it by means of a tuyere introduced into the furnace through the small door. This is necessary, because, when the blast is turned on, the flame is blown back and prevents the air from entering by the door. During all this time (about an hour is required to heat and melt the scrap iron) the sole has remained stationary; it is now for the first time set in motion and makes between 3 and 4 revolutions in a minute, thus causing the oxide of iron to spread itself over the whole of the surface. The puddler lines the edges with his rabble. The motion of the sole is especially favorable to this lining, and a fixed jet of water, playing upon the exterior surface of the trough, prevents it from becoming hot, and has also the effect of quickly setting the lining, while the sole is being turned round on its axis. This jet of water aids greatly in the maintenance of the furnace, as the sole, in revolving, presents every part to it in succession. It also allows of waiting for the trough, provided with a circulating current of water, which is being constructed. This done, the sole becomes completely coagulated and hardened while the furnace bars are being cleaned. The furnace is then ready to receive the charge, and, in following operations, the sole is repaired by melting into it fresh scrap, when it becomes too thin.

We shall now describe the treatment of a charge of charcoal iron from Toga, in Corsica, treated at a white heat, the quantity, as at present fixed, being 500 kilogrammes (about ½ ton). After having, in accordance with the usual practice, introduced the slag and scales into the furnace, the charge of pig is put in. This has already been brought to a red heat in a special furnace, which may serve for several puddling furnaces in works definitely arranged. Melted pig may also be charged into the furnace, as is done in other cases. The blast is turned on under the grate, while this melting takes place. The trough remains stationary during this time; however, if it should at all approach a red heat, a few turns may be given to it, so that it may be cooled by the fixed jet of water. In the case of the new trough, the current of water will keep it sufficiently cool.

The charge of 500 kilogrammes (about ½ ton), put in at a red heat, will begin to melt at the end of a quarter of an hour, and will be entirely melted at the end of thirty-five minutes; it is now that the actual process commences. As in other furnaces, the charge must be puddled; but, in this furnace, the puddling takes place by the rotation only; the sole is therefore made to revolve, at this period of the operation, about three times in a minute. The mixing and the puddling thus take place, without manual labor, by the rotation of the trough only; the damper is regulated by the puddler, according to the different periods of the process, of which he takes notice by trying the metal with his balling tool from time to time.

At the commencement of the operation, and especially with the gray pig, which takes longer to attain consistency, the damper is kept down. This first part of the process is hastened by sending a jet of water over those portions which stand out from the sole. The whole surface is therefore coagulated, since all the parts emerge successively. This proceeding has, besides, the advantage of keeping the sole from burning, and, consequently, of diminishing the expense of maintenance. For the charge under notice, the thickening of the metal takes place at the end of ten minutes; the damper is gradually raised, and, at the end of a quarter of an hour, as much draught and heat are given as possible, when the metal will be in a complete state of fusion.

The bubbling lasts about ten minutes; the charge then begins to diminish in volume, and the iron to assume a proper consistency; the trough is revolving all this time. The puddler helps with his balling-tool the operation which is taking place in the furnace, with little trouble to himself, notwithstanding the great quantity of metal; for, by keeping his rabble firmly in one position before the door and leaning his weight upon it, he is enabled to separate all the portions of iron, as they become formed. The revolution is allowed to continue, in order to work the iron, until it is felt to be of the proper consistency, separated from the slag and ready to be accumulated in balls—a period which arrives after the work has been continued about twenty minutes.

The puddler then commences to divide the iron, in order to make the balls, and he takes out his first ball at the end of about ten minutes. He is thus greatly helped in the hard work of forming the balls, for he is continually working before the door, without being obliged to move to the right or left to gather up the iron; he brings the ball to the door, before him, at the same time causing the trough to make the necessary way for it.

For a charge of 500 kilogrammes (about ½ ton), seven to eight balls are made; and this work, including the conveying them to the steam-hammer, takes about half an hour.

The duration of one operation, divided as follows, is, roughly, two hours and a half:

35	minutes	to heat the pig.
20	"	for the re-action.
25	"	for working the iron.
30	"	to form the balls and shingle them.
30	"	for cleaning the bars and reheating the furnace between two operations.

2 h. 30 min. for the whole time.

In short, M. PERNOT's furnace, with revolving sole, appears to have solved the question of mechanical puddling, without introducing too much change into the actual conditions of the work. Although the short time over which the trials have as yet extended does not admit of definite figures being given, it must be allowed that by means of the Pernot furnace a great saving is effected in coal, scrap iron, and labor; the production is increased, and the quality of iron improved and made more uniform.

M. MOLINOS was enabled to add to the abstract of M. J. PETIN's report, which he had just read, a few particulars as to the working of a Pernot furnace of large dimensions, now in operation at Saint-Chamond.

The regular production per week—that is to say, in eleven shifts of twelve hours each—is 25,000 kilogrammes (about 25 tons) of fine iron; while, with the same gray charcoal pig, an ordinary puddling furnace only yields 12,000 kilogrammes (about 12 tons.)

The charge for 1000 kilogrammes (about 1 ton), is 1030 kilogrammes (2277 lb.), instead of 1070 kilogrammes (2359 lb.), for the ordinary furnace.

The consumption of coal is reduced from 1500 kilogrammes (about 1½ ton) to 1200 kilogrammes (nearly 1 ton 4 cwt.)

The consumption of scrap iron is reduced to Zero.

Lastly, manual labor is diminished.

These various advantages amount to a saving, well authenticated, of 21 to 22 fr. (16s. 9d. to 17s. 7d.) per ton.

On these several accounts, M. MOLINOS was of opinion that the Pernot furnace well deserved being brought under the notice of the Society.

M. JORDAN, the President, then made the following observations with regard to this communication: He had listened with great interest to the fresh information furnished by M. PETIN, Jr., as to the improvement of the Danks process in England; he had himself received some further details as to the results obtained with the rotary puddling furnace in the large works of Carlton and Erimus, since his journey of last September, and they quite coincide with the views of M. PETIN. Of the value of the rotary furnace, as an appliance for refining the pig, there was no longer any question; but, in addition to this, attention was now being turned to the machine tools which are required to shingle and roll the enormous balls of 400 or 500 kilogrammes (about 8 to 10 cwt.), which are taken from the Danks furnace. The advantages and disadvantages of the system had lately been thus summed up in England:

Advantages.—1st. Skilled puddlers might be dispensed with, a great saving in labor, as compared with the ordinary puddling, being thus effected.

2d. The production of a Danks furnace is about five times greater than that of an ordinary furnace.

3d. The quality of the iron turned out is such, that mechanically-puddled bars fetch 25 fr. (20s.) per ton more than hand-puddled bars.

4th. The labor of the men is not nearly so hard as that on the old system.

5th. A saving is effected in the consumption of coal.

Disadvantages.—1st. The great cost of the erection of the works in the first instance.

2d. The increased loss due to accidents, since any damage done to the squeezer, or rolls, would involve a prolonged stoppage of the whole of the costly plant. The squeezers of Carlton and Erimus are gigantic machines, and the rolls of Carlton are of still greater proportion. A double set of these appliances could not be put down without incurring enormous expense, and taking up a great deal of room; and, on the other hand, they cannot be made less powerful, since they have to deal with enormous masses of puddled iron.

At Darlington, recently, a special machine was designed to divide these large masses of iron into several pieces, so that they might be worked by the ordinary appliances for shingling and rolling; but this machine has not yet been at work a sufficient time for a definite verdict to be pronounced upon it.

The furnace constructed by M. PERNOT, at Saint-Chamond, does not possess these disadvantages. The puddle balls produced by it may be dealt with by the shinglers and rolls at present in use. It also appears to lend itself, better than the Danks furnace, to the modifications of working required by the different kinds of pig.

Science in Education.—Sir JOHN LUBBOCK, in a recent address, expressed the opinion that the great fault of the English system of education was the neglect of science. In classical studies there was too much of the grammar and too little of the literature, but to abandon the study of the latter would be a fatal mistake. Some few years since it would be deemed incredible that a boy should be allowed to pass through any good school and to be entirely ignorant of any one branch of natural science. That nation, he argued, would have an immense advantage in the struggle for existence, which first gave its children an education in which literature, mathematics, and natural science should each have its proper place.

Notes.

The Struthers Furnace, Ohio, is turning out forty-five tons per day of good, No. 1 iron. JAMES KENNEDY is the founder.

George Daniels, roll turner at the Enterprise Mill, Ohio, has invented an ingenious contrivance to take burnt spots from rolls.

The Miners at Mineral Ridge, Ohio, are on a strike, owing to a proposed reduction of a small amount, to correspond with prices paid for mining block coal. The shaft at Vienna has been lying idle for some time, owing to a strike.

Dull Times at Cow Bay.—A correspondent, writing from Cow Bay to the Cape Breton *Advocate*, says: "Times are extremely dull here at present. The mines are closed, and only three or four men are employed in keeping the pumps going. No one can say what the result will be.

Sixty thousand dollars' worth of stock in the East Pennsylvania Iron Company, whose works are situated at Lyons Station, O., has been disposed of to the Hereford Iron Company, of New York. Mr. JOHN NOBLE, of Pottsville, also sold $20,000 to the same parties. This purchase will give that company a controlling interest, and the furnaces will be blown in as soon as coal can be procured. They will make a specialty to produce only "steel iron."

The Mine Inspector, Mr. Roy, reports that the operators and miners in the Mahoning Valley have compromised upon a reduction of five cents per ton on mining. The operators desired to reduce wages ten cents. The compromise, it is believed, saved a strike. Business in the Straitsville Valley has revived considerably. Most of the mines are running on full time. In other mining localities the improvement in this respect has not been so great, but business seems to be reviving slowly and steadily.—*Columbus, O., Journal.*

East Broad Top Coal.—The East Broad Top Railroad is 30 miles in length, (3 feet gauge) extending from the Pennsylvania Railroad, at Mt. Union, to Robertsdale mines, belonging to the Rockhill Iron and Coal Company. There are four openings, on two veins. The lands of the company are estimated to contain between 80,000,000 and 100,000,000 tons of coal. They expect to supply their furnaces at Orbisonia, and to ship to the general market, where their coal has already been introduced.

How Poor People get Homesteads in Philadelphia.—In acquiring a homestead in Philadelphia men of small means do not buy the lot outright. They lease the lot (18×90) in size forever on entering into an agreement to pay six per cent. per annum on its present market value. Building associations are willing to erect houses on lots thus leased on payment of about one-quarter cash down. This is why there are more houses, fewer tenement dens and more independence among poor men in Philadelphia than in any large city of the United States, if not of the world.

An Important Change at Troy.—From the Troy *Whig* of March 2nd we learn the following: "Notwithstanding the paralyzing effect on our iron trade by the panic, a corporation has been organized in this city which will probably embrace larger interests than any manufacturing organization in the United States. The corporation will be called the Albany and Rensselaer Iron and Steel Company, and takes the place of the firm of JOHN A. GRISWOLD & Co., which has been dissolved. The new enterprise goes at once into full operation, and continues the business of the former firm. It also includes the Albany Iron Works lately owned by ERASTUS CORNING & Co. Of the new corporation ERASTUS CORNING is President; CHESTER GRISWOLD, Vice-President; JAMES E. WALTER, General Manager; and SELDEN E. MARVIN, Secretary and Treasurer.

Gauging Boiler Evaporation.—A German chemist determines by chemical analysis the amount of water evaporated by a steam boiler. By means of a standard solution of nitrate of silver he first determines the quantity of chlorine in the feed-water, and then the quantity of chlorine in the water of the boiler at two different times several days apart. From the increased quantity of chlorides he calculates the amount of water evaporated. He recommends as a suitable normal solution of silver to dissolve 23.94 grains nitrate of silver in 1000 centimetres of distilled water. Each cubic centimetre of this solution will precipitate exactly five milligrams of chlorine. To indicate the end of the reaction when all the chlorine is precipitated, he employs the neutral chromate of silver, which produces with any excess of silver solution a bright red color.

Eliminating Phosphorus from Iron.—The process of eliminating phosphorus from cast iron, which was first proposed, to the best of our recollection, by Professor SCHEERER, of Freiburg, is represented by the foreign technical press as quite successful in practice. By its employment, it is said, a very superior bar iron can be made from phosphoreted cast iron, at practically no increase of cost. The process consists in the use of a fused mixture of chloride of calcium and common salt mixed in equal proportions, which is intimately mixed with the molten iron in the puddling furnace, either by adding it gradually in 2-lb. water-tight packages, or placing the whole quantity required upon the bed of the furnace at first—in either case working it very thoroughly with the metal. The puddling process is said to be generally so much shortened that the consequent diminution in the waste of iron almost equals the cost of the materials added. The quantity of the mixed chlorides required is about three times that of the phosphorus present in the iron. The action of other chlorides is stated to have been found very disadvantageous.

COAL TRADE REVIEW.

Import Duty on Coal.

Anthracite free. *Bituminous*, per ton of 28 bushels, 80 lb. to the bushel, 75c., gold.

All *slack*, or *culm*, such as will pass through a half-inch screen, per ton of 28 bushels, 80 lb. per bushel, 40c., gold.

Not otherwise provided for, per ton, 40c. gold.

This is the only report published that gives full and accurate returns of the production of our Anthracite mines.

NEW YORK, March 13, 1875.

Comparative Statement of the Production of Anthracite Coal for the week ending March 6:

	1875.		1874.	
	Week.	Year.*	Week.	Year.*
Wyoming Region.				
D. and H. Canal Co	53,036	450,023	53,430	342,130
D. L. and W. RR. Co	53,464	383,301	43,809	380,957
Penn. Coal Co	19,574	200,386	24,228	186,696
L. V. RR. Co	14,011	195,099	17,365	163,149
P. and N. Y. RR. Co	964	1,963	381	9,186
C. Rr. of N. J	5,581	29,947	30,484	139,004
Penn. Canal	..	..	..	..
Lack. and B. RR	..	28,696	..	25,493
	146,630	1,289,475	169,697	1,246,615
Lehigh Region.				
L. V. RR. Co	2,992	86,996	44,004	449,651
C. RR. of N. J	933	3,572	11,601	88,398
D. H. and W. B. RR	759	3,815	..	11,408
	3,684	96,383	55,605	549,457
Schuylkill Region				
P. and R. R. RR. Co	19,717	141,350	45,425	399,809
Shamokin and Lykens Val.	9,028	85,288	9,318	74,503
	28,745	226,638	54,743	474,312
Sullivan Region.				
Sul. and Erie RR. Co	260	2,198	102	4,530
Total	179,319	1,614,694	280,147	2,274,914
Increase	..	..	..	..
Decrease	100,828	660,220	..	..

* Year beginning January 1st.

The above table does not include the amount of coal consumed and sold at the mines, which is about five per cent. of the whole production

The following table does not give the entire production of our bituminous mines, but it is by far the fullest report published.

The Production of Bituminous Coal for the week ending March 6, was as follows:

Tons of 2000 lb., except where otherwise designated.

	Week. Tons.	Year. Tons.
Cumberland Region, Md.		
Tons of 2240 lb	21,605	168,715
Barclay Region, Pa.		
Barclay R.R. tons of 2240 lb	4,650	80,138
Broad Top Region, Pa.		
Huntingdon & Broad Top R.R	3,739	26,986
East Broad Top	565	3,881
Clearfield, Region, Pa.		
Snow Shoe	1,518	11,901
Tyrone and Clearfield	17,492	106,776
Allegheny Region, Pa.		
Pennsylvania R.R	3,965	29,745
Pittsburgh Region, Pa.		
West Penn. R.R	3,518	29,813
Southwest Penn. R.R	124	937
Penn. and Westmoreland gas coal, Pa. RR.	19,843	126,260
Pennsylvania R.R	5,286	38,675
Kanawha Region, W. Va.		
Chesapeake and Ohio R.R	1,430	15,412

Production of Bituminous Coal. 1875.

Tons of 2000 lb.	Jan.		
Blossburgh Region	19,039	..	..
Barclay Region	28,605	..	..
McIntyre Coal Co	5,911	..	..
Broad-Top Region	11,507	..	..
Cumberland Region	87,579	..	..
East Broad Top	1,790	..	..
Snow Shoe	6,277	..	..
Clearfield Region	47,453	..	..
Alleghany Region	14,887	..	..
Pittsburgh Region.			
West Penn. RR	16,055	..	..
Southwest Penn. RR	413	..	..
Gas Coal, Penn. RR	61,055	..	..
Pittsburgh Coal, Penn. RR	22,172	..	..
Saw Mill Run RR	287	..	..
Cleveland and Pittsburgh RR	20,882	..	..
Pittsburgh, Cincinnati and St. Louis RR	50,598	..	..
Erie and Pittsburgh RR	11,998	..	..
Pittsburgh, Fort Wayne and Chicago RR	13,718	..	..
Castle Shannon RR	..	..	..
A. Y. & P. R.R	242	..	..
Pittsburgh and Connellsville RR	..	..	..
Monongahela Nav. Co	..	..	..
Keeling & Co	..	..	..
Wettencal & Gormley	1,961	..	..
J. W. Carlin & Co	..	..	..
St. Louis Region.			
St. L. A. & T. H. R. R. Belleville Branch	..	..	..
B. & S. I. R.R	..	..	..
Illinois and St. Louis	..	..	..
Indiana North and South RR	264	..	..
Evansville & Crawfordsville RR	2,265	..	..
Ohio & Mississippi RR	..	..	..
Swanee Region.			
Tenn. Coal & R.R. Co	8,745	..	..
Kanawha Region.			
Chesapeake and Ohio RR	..	..	..
Warrior Region, Ala.			
South and North Alabama RR	..	..	..
Cahaba Region, Ala.			
South and North Alabama RR	..	..	..
S. R. & D. R.R	1,257	..	..
Chicago R. & Q. R.R	37,634	..	..
B. & M. R.; R.R	7,371	..	..
Union Pacific R.R. Co.'s mines	..	..	..
" " " other mines	..	..	..
Summit County R.R	..	..	..
Keokuk & Des Moines R. R	..	..	..
Denver & Rio Grande	3,104	..	..
Cairo & St. Louis	3,106	..	..
	.....		

The Production of Coke for the week ending Feb. 28. Tons of 2000 lb.

	Week. Tons.	Year. Tons.
Tyrone and Clearfield	39	196
Alleghany Region	10	30
West Penn. R.R	884	8,903
Southwest Penn. R.R	9,114	70,484
Gas Coal, Penn. R.R	660	6,836
Pittsburgh Coal, Penn. R.R	2,028	10,956

The exports of coal from Baltimore this year amount to 6,923 tons, as compared with 16,252 tons in 1874. Exports for the week, none.

The receipts at Buffalo by the L. S. & M. S. R. R. for the week were 3,839 tons.

Receipts at Port Richmond, none; shipments, 7,000 tons; and balance on hand 39,000 tons.

Receipts from Greenwich, Philadelphia:

	Bituminous.	Gas Coals.
Receipts	1,6c4	45
Shipments	2,364	....
On hand	389	270

	week.	year 1875.	year 1874.
The receipts of coal at Coal Port (Trenton)	..	..	..
" " " South Amboy	163	16,330	126,522
Shipments at Coal Port (Trenton)	..	..	..
" South Amboy	8,036	53,730	87,220

A strong demand continues for certain sizes of anthracite coal, and circular prices are being obtained in most instances. The Sound ports continue to be troubled with ice, although the shipping ports are open. We are informed that manufacturers and others are not contracting for large quantities of coal, but are simply purchasing for immediate requirements. It is their belief that either miners or companies will give way in time to prevent a panic in coal, and anticipating an abundant supply afterwards, they see no inducement, under the present programme of the companies, to anticipate their wants.

There is a great diversity of opinion regarding the probable termination of the strike, some saying it looks farther from being brought to a close than at any previous time, and others thinking that the miners are weakening. The actual position of affairs, however, is without material change, excepting that the Hanover Colliery, of the Lehigh and Wilkes-Barre Coal Company, has resumed work at the reduction. This might, to some, indicate an inclination on the part of the company's men to submit to its terms; but this colliery is rather disconnected from the others, and more particularly from those producing the greater portion of the company's coal, and the action of the men there is not likely to have a very important, though undoubtedly it will have some, influence upon those still on strike. The Philadelphia and Reading Railroad Company is in receipt of information from Schuylkill County to the effect that there is a discord among the miners in that district, and that a large number of the men are anxious to resume work. Our Pennsylvania exchanges contain resolutions, passed by the various branches of the Union, to resist indefinitely the demands of the companies for a reduction of wages, and expressions of their ability to stand out all summer if necessary. Past experience has shown us that they may stand firmly by their resolutions, and may be fully as strong as they state they are; but, again, we have seen them resume work in

a week after passing the strongest resolutions, and expressing their determination to stand out indefinitely. Those who should be best informed upon the present position will not venture an opinion.

The Pennsylvania Railroad Company has followed the Baltimore and Ohio Railroad Company, and reduced freights from State Line to South Amboy 25c. per ton. The feeling still exists that even better rates will be given when the companies are ready to move their coal.

It is said that the officers of the Chesapeake and Ohio Canal have expressed their willingness to reduce tolls 5c. per ton and wharfage at Cumberland a similar amount. Canal freights will probably rule about 10c. per ton under those of last year, which will make a reduction in the cost of laying down coal at Georgetown of 20c. It is thought the canal may concede an additional 5c. per ton on tolls, making the total reduction 25c. If this is done, it will be of great benefit to the Cumberland coal interest, and with $4 as the ruling price it is but fair to anticipate an increased demand, which can be promptly met. We learn of a contract to deliver from 3000 to 4000 tons in Boston at $6. This was done on the guarantee of tolls, etc., so far given. The canal will probably open about the 20th inst., but no coal is anticipated at Georgetown until the beginning of next month.

The bituminous trade is rather quiet, although there is some coal moving in a small way. The Cumberland companies are making strong efforts to secure trade for the coming season although prices have not yet been made.

The *Bulletin* of the Iron and Steel Association, in relation to the use of coke by Eastern furnaces, to which we drew the attention of our readers last week, says: "Several furnaces in the Susquehanna and Schuylkill Valleys which have always used anthracite as fuel are making arrangements to substitute Connelsville coke during the present month. The coke is delivered on cars at convenient points in the Connellsville basin, connecting with the Pennsylvania Railroad, at three cents a bushel, or $1 50 per net ton—50 bushels making a ton. Transportation to Harrisburg and points adjacent is $2 60, making the cost at furnace $4 10. To furnaces on the Schuylkill the freight charges will not exceed $3 60, making the cost of a ton of Connellsville coke to them about $5. Even at this price it is believed that the coke is cheaper than anthracite, if the latter were obtainable, which it now is not. Among the parties prepared to supply coke at short notice are Messrs. Stoner, Hitchman & Co., of Mount Pleasant, Westmoreland County, Pa. We do not hear of any furnace in the anthracite region that has yet been blown out in consequence of the scarcity of coal."

Freights from this port continue quite nominal. For small vessels for single trips from Baltimore to Boston, $2 25@$2 30 has been paid. We note the charter of two vessels to sail from Baltimore to Boston for the season at $2. There is a scarcity of vessels at Baltimore at the present time, but it is reported that there is a large fleet on its way there, which, upon its arrival, will tend to make freights easy. There are a large number of vessels, which have wintered in harbors, that are still frozen up, that have not yet come into the market. We note the charter of a vessel from Georgetown to this city at $1 40. The present outlook is for low coastwise freights. Messrs. PERKINS & JOB, in their circular just issued, say:

"The market remains quiet with the exception, perhaps, of a demand for medium size vessels for the West Indies and South America.

"*Coal* from the Provinces to the United States.—There are no orders, as yet, for this business, and the requirements for the coming season will be very light. The effects of the excessive importations of 1873 being still felt—these in connection with the very low prices of American coal, will reduce this business to smaller proportions than in former years. The opening rates for the small quantity required will not be far from those of last fall, viz.: $1 75 to $2. Louisburg, C. B.—The railroad connecting the different collieries with this port will be completed the present month; the shipping piers with facilities for loading steamers and sailing vessels of the largest size, at all seasons of the year, will be ready at the same time."

There has been no further movement in gas coals. As yet no sales of Provincial coal have been made.

Our Montreal correspondent gives particulars of a sale of 60,000 tons of coal to the Grand Trunk Railway.

The strike continues at the Penn and Westmoreland collieries.

Wholesale Prices of Bituminous Coal.

The following prices are principally fixed for the season, except where otherwise indicated.

Domestic Gas Coals.

Per ton of 2240 lb.	Shipping Ports.	At the	Alongside in New York.
Westmoreland and Penn, at Greenwich, Philadelphia		$5 25	$6 60
" " at S. Amboy		6 10	6 60
Red Bank Cannel Pa., at Phil		8 00	8 50
" " at S. Amboy		8 50	..
" Orrel, "		6 50	7 00
" " at Philadelphia		6 00	...
Youghiogheny, Waverly Co, at Baltimore		....	6 60
Despard, West Va., nominal "		5 60	6 60
Murphy Run, W. Va. at Baltimore, nom.		5 60	6 60
Fairmount, W. Va " nominal		5 60	6 60
Newburgh Orrel, Md. " "		5 50	6 60
Cannelton Cannel, W. Va., at Richmond.		9 50	11 00
" Splint, " " nom.		5 25	7 50
Peytona Cannel, " " "		....	11 00
Straitsville, "	At Sandusky, O. "	3 65	11 50

Foreign Gas Coals.

	Sterling.	Am. cur'cy.
Newcastle, at Newcastle-on-Tyne	12/@13/6	6 50@ 7 00
Liverpool House Orrel, at Liverp ol	26/	13 00
Ince Hall Cannel "	47/	18 00@20 00
" Gas Cannel "	36/	15 00
Scotch Gas Cannel, at Glasgow, nominal.	28/	9 50
	Gold.	
Block House, at Cow Bay, N.S.	2 00	6 50
Caledonia, at Port Caledonia	1 75	5 70
Glace Bay, at Glace Bay	1 80	5 50
Lingan, at Lingan Bay	1 75	....
Sydney, International and Reserve mines, at Sydney	2 25	5 75
Pictou, Albion and Vale mines, at Pictou	2 50	6 50

Steam and House Coals.

Broad Top, at the mine, $1.25; at Amboy	5 25@5 50	5 75@6 00
Cumberland, at Georgetown and Alexandria, Va.	4 30@4 50	....@....
Cumberland at Baltimore	4 60@4 75	6 75@7 00
Clearfield, " Derby," " Kitanning," "Sterling," and "Eureka," at the mines, $1.25; at Greenwich, Phil.	4 60	5 80
James River, carbonite, at Richmond, Va	6 75	9 00
" bitumimous, " nom.	4 00	6 25

Wholesale Prices of Anthracite Coal f.o.b., at the Tide Water Shipping Ports per ton of 2240 lb.

Circulars of the following coals have been issued for the month of March, fixing prices considerably under these rates, conditional on the miners "now on a strike" resuming work during the present month.

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
Wyoming Coals.						
†Lackawanna and Scranton at Elizabethport & Hoboken	5 55	5 65	5 75	5 90	6 40	5 35
*Pittston at Weehawken	4 85	4 85	4 95	5 05	5 60	4 60
*Wilkesbarre at Port Johnston	5 55	5 65	5 75	5 90	6 40	5 35
Plymouth, R. A	....	....	5 75	5 90	6 50	5 35
Susque. Coal Co. at Amboy W.A.	5 55	5 65	5 75	5 90	6 50	5 35
Kingston at Hoboken	5 55	5 65	5 75	5 90	6 40	5 35
***Lehigh Coals.**						
Old Company at Port Johnston	6 50	....	6 45	6 45	6 60	5 65
Old Company's Room Run "	6 00	....	6 00	6 00	6 35	5 35
Sugar Loaf at "	6 00	....	6 45	6 45	6 60	5 65
Lehigh Coal Exchange "	6 35	....	6 30	6 30	6 45	5 50
Honey Brook at Elizabethport	6 35	....	6 30	6 30	6 45	5 50
Spring Mt. C. Co. at Hoboken	6 35	....	6 30	6 30	6 45	5 50
Beaver Meadow at South Amboy	6 35	....	6 30	6 30	6 45	5 50
Schuylkill Coals.*						
Schuylkill white ash	5 55	5 65	5 75	5 90	6 40	5 35
Schuylkill red ash	...	....	5 75	5 90	6 50	5 35
Shamokin white and red ash	....	....	....	5 90	6 40	5 35
N. Franklin	....	....	....	....	....	....
Lorberry	....	....	....	....	....	....
Lykens Valley	....	....	....	....	....	....

* Small or Pea coal is quoted by these Companies at $1 35 per ton less than Chestnut.

† f.o. b. in New York Harbor.

* This is the rate for Schuylkill coal deliverable on board vessels at North 9th street, Williamsburgh.

Pittston coal is delivered to carts in New York or Brooklyn at 40 cents per ton in addition to the above rates.

	Per ton.
Freight from Hoboken and Weehawken to New York	45c.
" " Elizabethport & Port Johnston to New York.	45c.
" " South Amboy to New York	50c.

Retail Prices in New York.

Anthracite.

Per 2000 lb.	Grate and Egg.	Stove.	Chestnut.
Pittston coal, in yard	$6 00	$6 20	$5 40
Lackawanna Coal, del'd	7 60	7 85	7 10
*Wilkes-Barre, delivered	7 60	7 85	7 10
Lehigh & Locust Mountain, del'd	8 00	8 00	7 50
Schuylkill Red Ash del'd	8 25		

The cost of delivering Pittston coal ranges from 40 cents to $1 per ton, according to distance from the yard.

* Twenty-five cents less than the above rates are charged to manufacturers.

Bituminous.

Liverpool House Orrel, delivered, per ton of 2000 lb			$23 00
Liverpool House Cannel	"	"	25 00
American Cannel	"	"	16 00
American Orrel	"	"	$15 00@16 00
Straitsville Cannel	"	"	15 00@16 00
Carbonite	"	"	12 00
Cumberland	"	"	9 00
Acadia, Pictou, N. S.	"	"	14 00

Coal Trade of Philadelphia.

PHILADELPHIA, March 11, 1875.

The stocks continue to run down here. The supply from the Shamokin is not sufficient to meet the current demand. Some Wilkes-Barre, and even Scranton, coal finds its way to the furnaces on the line of the Schuylkill, and along with Shamokin and coke, helps preventing some of them to go out of blast. If a mixture of fuels is as advantageous in making pig metal as a mixture of ores, now is the opportunity to find it out. The bulk of coal on hand here at the wharves is stove size, some of which is finding its way to Southern markets, now pretty short. A few vessels are loading for Norfolk, Richmond and Washington at low rates for the season—$1 10 to Richmond and $1@$1 10 to Washington. The less is said of the muss into which the companies rushed with such delight, the better. The end of the difficulty appears no nearer than it was two months ago. The present strike threatens to be more disastrous for the anthracite coal trade than any which has formerly occurred.

Baltimore, Md. March 9, 1875.

Reported by our Special Correspondent.

WHOLESALE PRICES PER 2240 lb.

ANTHRACITE.

	By cargoes.	In cars.
Wilkes-Barre, "Lee," or "Diamond,"		
Lump, steamboat	$5 15	$5 60
Broken	5 50	5 75
Egg	5 87	6 15
Stove	6 07	6 35
Pittston and Plymouth.		
Lump and steamboat	....	5 50
Broken	....	5 70
Egg	....	6 05
Stove	....	6 25
"Boston," freeburning white ash	....	5 50
Egg	5 87	5 70
Stove	6 07	6 05
Shamokin, (red or white ash)	....	6 25
Egg	5 82	6 05
Stove	5 92	6 15
Lykens Valley, red ash, egg and stove	6 02	6 55

From wharf or yard, wholesale, 50@75c. additional.

By retail, all kinds and sizes, per 2,240 lb, $7@8 25.

BITUMINOUS.

George's Creek and Cumberland f. o. b. at Locust Point for cargoes	4 60	4 75
West Va. Gas Coal f. o. b. at Locust Point	5 50	....
Kanawha Cannel, coarse	13 00	....
Tyrone	7 25	....
Ritchie Mineral of West Virginia	1 00	....

Boston. March 9, 1875.

Reported by our special correspondent.

CARGO PRICES TO TRADE.

Lingan coal	$ 5 75	Westmoreland, and Penn.	7 75
Caledonia	5 00	Waverly Co. Youghiogh'y	7 75
Pictou	6 15	Cannelton Cannel	13 50
Block House	5 60	Cumberland	6 85@ 7 00
Red Bank Cannel	10 00	Anthracite	.6 50@ 7 25
Glace Bay	5 00	" Retail	.7 50@ 8 00
Sydney	7 00		

The *Commercial Bulletin* says: "There is very little coal in the hands of wholesalers, and not much can be done in the way of large sales. Retail dealers, however, are doing a very good business."

Buffalo, N. Y. March 9, 1875.

Per ton of 2000 lb.

	Slack.	Nut & Slack.	Nut.	Lump
Connelsville coke				6 00
Sterling cannel				6 00
Red Bank				5 75
Youghiogheny coal for gas				5 50
Briar Hill coal		3 25		5 00
Fairmount "		3 25	3 60	4 00
Catfish "		3 25	3 60	4 00
Stoneboro "	2 75		3 75	

Briar Hill coal, and Stirling and Red Bank cannels retail at $7 50; all other coals $1 per ton above wholesale prices.

Anthracite f. o. b. vessel.

Grate	6 70	Stove	7 15
Egg	6 70	Chestnut	6 65

Retail prices delivered and screened, $1 per ton additional.

Cincinnati, O. March 9, 1875.

Our quotations are as follows:

Per ton of 2000 lb.

	Bush.	Ton.
Youghiogheny, or Pittsburgh, afloat	9 c.	——
Pomeroy coal "	6¾c.	——
Cannel coal	—	——
Semi Cannel	—	——

The following are retail prices delivered:

Youghiogheny	— c.	$3 35
Pomeroy	— c.	2 80
Cannel	— c.	5 60
Kanawha Semi Cannel	— c.	3 35
Anthracite		10 00
Foundry coke	— c.	5 80
Soft coke	10 c.	——

Detroit, Mich. March 9, 1875.

Specially reported by Messrs. ROBINSON & KEYS, dealers in all kinds of coal.

We have nothing new to report this week. There is still a very fair demand for supplies. The yards are nearly bare of stocks, but will not need a great deal to see them through the balance of the season. Prices remain as last quoted.

Per ton of 2000 lb.

Lehigh Lump, per ton	$10 50	Blossburg	8 50
Lehigh " prep. sizes.	10 00	Briar Hill	7 50
Wilkes-Barre, Grate and Egg	9 00	Willow Bank	7 00
Wilkes-Barre, Stove and Nut	9 50	Erie	7 50
		Massillon	7 00

Erie, Pa. March 9, 1875

Reported by our Special Correspondent.

Wholesale, per ton of 2,000 lb.

Bituminous f.o.b.

Briar Hill lump	$4 00	Beaver lump	$4 00

Louisville, Ky. March 9, 1875.

Specially reported by Messrs. BYRNE & SPEED.

Please report our prices same as last week. We expect changes after arrival of coal from Pittsburgh. Our demand is only moderate.

Pittsburgh, per load of 1900 lb	$3 75
Pine Hill	3 25
Buckeye Cannel	5 00
Peytona Cannel	5 50
Nut and Slack	2 25
Pine Hill nut	....
Kentucky lump, per load	...
" nut, "	....
" Slack "	....
City-made Coke, per bushel	....
Pittsburgh, wholesale, per bush	....
Kentucky on cars at wholesale, per bush.	....
Anthracite, per ton	$10 to $10 50

New Orleans, La. March 6, 1875.

Our market is unusually dull, and we may consider the season as ended. The present and prospective demand being very limited, prices are weak and some look to a still further decline in prices.

The stock afloat on the 1st of this month was 106 boats, 7 barges; consumption, 16 boats 12 barges; arrivals, 15 boats. We quote:

Pittsburgh coal, retail, per bbl	75c
" wholesale	30c.
" to steamboats, per box	60c.
" to manufacturers, per bbl	65c.
" shipments per hhd	$7 00
Anthracite, retail, per ton	$12 50
" wholesale per ton	
Spadra (Arkansas) coal, retail, per bbl	75c.
Mt. Carbon, wholesale, per bbl	45c.
" " retail per bbl	65c.
Virginia Cannel, per bbl	90c.
Scotch Cannel, per bbl	1 00

Pittsburgh, Pa. March 8, 1875.

Reported by our Special Correspondent.

Coal trade remains dull, with no immediate prospect of an improvement, the puddlers still refusing to resume work, and the manufacturers being fully as determined in their stand. Coke business is improving some in consequence of the trouble in the Anthracite districts.

Per ton of 2000 lb. and Bushel of 76 lb.

per ton.		per ton
Youghiogheny coal	$2 00	Pittsburgh retail delivered per bushel	9c@10c
" coke	2 00@2 25		
Connellsville coal	2 10	Anth'cite on cars	Lehigh $7 75
" coke	$2 25@2 50	" "	Wilkes-
Pittsburgh coal	1 85	Barre	6 75

Twenty-five to fifty cents per ton additional for delivery.

San Francisco.

From the *Commercial Herald*, Feb. 25, 1875.

Imports from January 1st to February 15, 1875:

Anthracite, tons	1,807	English, tons	17,706
Australian, tons	12,522	Vancouver Island, tons	6,974
Coos Bay, tons	5,046	Rocky Mountain, tons	24
Cumberland, tons	1,501	Seattle, tons	2,008
Mt. Diablo, tons (1 mo)	14,181	Bellingham Bay, tons	1,350

The market lacks animation under the influence of liberal foreign supplies now afloat; at the same time, Pacific Coast supplies are more plentiful than ever before. Recent receipts embrace the following cargoes: 755 tons Seattle, per *Osmyn*; 300 tons, per *W. H. Meyer*; 300 tons Coos Bay, per *Aurora*; 245 tons same, per *Sheet Anchor*; 454 tons same, per steamer *Empire*; 889 tons Wellington, per bark *Amie*. Australian is in very free supply, and prices do not advance as was predicted. The Wellington, from British Columbia, is becoming a decided favorite with families, being really a very superior and economic coal for household purposes. The supply of anthracite is limited; but of Cumberland the stock is larger than we are accustomed to carry. Low prices rule for all descriptions, and are substantially as for some time past. We quote Coos Bay at $10; Wellington, $11; Australian, by the cargo, $10c@$10.25; Bellingham Bay, $8.50; Mt. Diablo sells at $8.25 for coarse, and $6.25 for screenings. The ship *Emerald*, from Liverpool, brought 1034 tons.

Toledo, Ohio. March 8, 1875.

Specially reported by Messrs. GOSLINE & BARBOUR.

Per ton of 2000 lb.

Retail.		Retail.
Wilkes-Barre and Scranton, Large and Small Egg	$8 50	BITUMINOUS.
Stove	8 50	Blossb'g and Cumberl'd	$9 00
Chestnut	8 50	Massillon Lump	6 00
Lehigh Lump	10 00	Briar Hill	6 50
		Massillon	6 00
		Hocking Valley, scd & nut	5 00

Soft coal screened retails from $4 00 to $6 00, according to quality.

Halifax, N. S. March 8, 1875.

Reported by our Special Correspondent.

Prices per ton of 2240 lb. in gold.

Sydney (old mines)	$4 50	Little Glace Bay	3 50
Gowrie	3 50	Blockhouse	4 00
Victoria	3 50	Albion (at Railroad)	4 25

Montreal. March 9, 1875.

Specially reported by Messrs. ROBERT ADAMS & Co.

Our anthracite market is unchanged except in the price of chestnut coal, which, owing to a scarcity of this size, has advanced to the same figure as stove. Other sizes are believed to be in sufficient supply, and no further advance is expected. The Grand Trunk Railway has awarded the contracts for its supply of steam coal for the coming season, and will receive about 60,000 tons here; 5,000 tons Scotch coal will be taken at about $5 35 on the wharf, and the balance is furnished by the Albion, Nova Scotia and Vale Mines of Pictou, N. S., at from $4 75 to $4,85 per ton. This price is fully $1 10 lower than what was paid last year, and it is estimated that on the 155,900 tons taken by the Grand Trunk Railway, East and West, a saving of $160,000 has been effected, in comparison with the rates of the last year. The demand for steam coal increases, and prices are likely to advance. We quote:

Wholesale per ton of 2,240 lb.

Scotch Steam	$6 25	Cape Breton Steam	$5 75
Pictou "	6 00	Newcastle Smiths	

Anthracite at retail, 2,000 lb., delivered, less 5 per cent.

Egg	$8 50	Chestnut	9 00
Stove	9 50		

Toronto, Ont. March 8, 1875.

Reported by our Special Correspondent.

ANTHRACITE.

per ton.		per ton.
Broken	$7 65	Chestnut	$7 65
Egg	7 65	Lehigh	9 00
Stove	8 15		

BITUMINOUS.

Blossburgh	7 50	Screenings	5 00
Briar Hill	7 00	Soft Nut	5 50

THE BRITISH COAL AND IRON TRADES.

From our exchanges bearing date of February 20, 1875.

England.—The Durham collieries for gas and house coals are well employed; but for manufacturing coals the pits are not at full work. In the Northumberland trade there is still a remarkable slackness. Coke has advanced about 1/ 6d. since the first of the year, and is being quoted at 15/ 6d.@16/ 6d., and foundry coke, 1/ to 2/ higher. The iron trade of the North of England is rather quiet, although there is a good demand for forge irons, and the demand for rails is improving, owing, mostly, to the strike in Wales. No. 1 pig iron is quoted at 63/ 6d.; No. 2, 61/; No. 3, 58/ 6d.; No. 4 forge, 56/. The makers have proposed to make a 10 per cent. reduction of wages, which is objected to by the workmen of a number of the firms, and the furnaces are being damped down in consequence. If a settlement is not soon made, the iron mines and collieries will be closed. In the Barrow-in-Furness district there is a much steadier tone. A fair number of purchases have been made during the present month, both in Bessemer and forge irons. Large sales of Bessemer have been made to the Sheffield district, where makers of steel are much busier than they have been for some time. They are pressing for the delivery of iron which they have contracted for. Some good business has recently been done with South Wales. Stocks of iron have recently been reduced, and the output of iron may be said to represent the demand. Trade with the Continent, however, does not show any improvement. The "Million" brand of No. 1 Bessemer is quoted at £4 10/, f.o.b. Barrow; No. 2, £4 7/ 6d.; No. 3, £4 5/. A correspondent, writing from Leeds, says: "The coal trade is not very brisk, and some of the mines are not working full time, and when they do work, are not working up to their capacity. Within five miles of Leeds, engine coal is quoted as low as 2/ 6d. The miners, although not pleased with the decision of Mr. DANIEL, Q. C., on the question of a reduction of wages, which he placed at 12½ per cent., have, nevertheless, accepted it, and have settled down to work. In the Dewsburry district, over 20,000 mill hands are on strike, as well as the colliers." Correspondence from Barnsley says: "The make of raw iron in the district has in no way fallen off, and a good deal of stone continues to be imported from the neighborhood of Fordingham, in North Lincolnshire. In manufactured iron, the business is tolerably good as regards light rails, plates and sheets, and ordinary forgings. Foundry metal is in rather brisk request, and at some places the moulders are very active, and making overtime. The coal trade has fallen off a good deal of late. The best Silkstones can be purchased at 16/ per ton; Barnsley house at 13/, and steam at 12/@12/ 6d. These prices are not likely to be maintained long, owing to an expected large surplus." "At Manchester there is a steady demand for all good qualities, at full rates; while inferior qualities show a weakness. Gas coal is in good demand, and prices are firm. The coke trade is quiet, but prices are generally maintained. The Liverpool market continues stiff, and high prices are obtained in consequence of the South Wales lock-out. The iron business in this district is not very brisk. The men at the Atlas Works are still on strike." In North Staffordshire there are some fair orders being placed. Prices are unchanged. The coal trade is quiet. The coal trade in the South Staffordshire district is rather quiet. Slack has been reduced 1/@ 1/ 6d. Best brands are bringing full circular prices. The price of common cinder pig is a trifle easier at £3 2/ 6d.; and all mine pig is freely offered at £5—being a reduction of 5/ per ton during the week. Second-class makers are soliciting orders for unmarked bars at £8 17/ 6d. Marked bars are steady on the basis of £10 10/, £11, and £11 12/ 6d per ton for the three ruling qualities of bars.

Wales.—The strike continues without change. The stronghold is in Rhondad Valley, and there is a general understanding that when the men of that district can be persuaded to return to work, the lock-out will be at once at an end. Lord ABERDARE has expressed his intention to advise the men to submit to the masters' terms. Mr. BROGDEN has shown the men that even after the proposed reduction they could earn 6/ to 6/ 6d. per day, by cutting the same quantity of coal as they did in January, 1870, when their average wages were 4/ 2d. per day. Double turns are being worked at the unassociated collieries, and the proprietors are making the most of the situation. Coal ranges from 22/@25/ per ton. There is but little coal or iron being exported. Many of the iron works are being compelled to suspend work, owing to a scarcity of fuel.

Scotland.—The warrant market closed at 73/ 6d. on Feb. 16. The quantity of pig iron in Connal's stores on the 15th was 30,417 tons, being 680 tons less than at the same time the previous week. Several of the principal makers' brands show a reduction, No. 1 being chiefly affected. The following are the quotations:—Gartsherrie No. 1, 87/ 6d., No. 3, 77/; Coltness, 90/ and 76/; Summerlee, 87/ 6d. and 76/; Langloan, 90/ and 75/; Govan, 75/ and 73/; Calder, 87/ 6d, and 75/; Shotts, 87/ 6d. and 76/ 6d.; Carnbroe, 84/ and 75/; Monkland, 75/ and 73/; Clyde, 75/ and 73/; Glengarnock, 85/ and 76/; Eglinton, 75/ and 73/; Dalmellington, 75/ and 73/; Kinneil, 82/ 6d. and 73/; Carron, 77/ 6d. and 75/. The shipments of pig iron from Scotch ports for the week ending Feb. 13th, amounted to 7,792 tons, being 654 more than in the corresponding week of 1874. The imports of Middlesborough pigs at Grangemouth for the week were 3,800 tons, being an increase of 620 as compared with those of the corresponding week of last year. Bars are selling at from £9 to £9 10/; nail rods, £8@£9; rails, £9; and pipes £6@£7.

The coal trade is steady, without any change in prices, there being an abundant supply of fuel for all purposes. Exports last week were heavy, having amounted to about 45,000 tons, or about 20,000 tons more than last year. The disputes in England, however, do not increase the demand to the extent that was anticipated. Generally speaking, the men are working quietly.

The Clyde Trustees have purchased the Lancefield Dock from Messrs. NAPIER & SONS, shipbuilders, at a cost of £35,000. This purchase gives the Trustees complete control over the whole of the north side of the river, and it will add considerably to the quayage for berthing vessels.

Rates of Transportation on Anthracite Coal to Tide Ports.

Lehigh and Wyoming Coals. per ton of 2240 lb.	From Penn Haven.	From Mauch Chunk.	From Hazleton.‡‡	From Upper Lehigh.	From Ashley and Sugar Notch.
To ‡ Newark, N. J. via Central Railroad of New Jersey	2 89	2 73	2 86	3 24	3 45
‡ Mauch Chunk, Pa. via Central Railroad of N. J.	16	..	56	51	72
‡ Phillipsburg, N. J.	1 09	93	1 34	1 44	1 65
‡ Elizabethport, Port Johnston, Hoboken and South Amboy, N. J. shipping and wharfage 35c. add.	2 47	2 31	2 80	2 82	3 03
High Bridge, N.J.	2 40	2 20	2 80	2 79	3 09
Somerville and Raritan, N J	2 80	2 60	3 20	3 19	3 49
Elizabeth, Cranford Westfield and Elizabethport, for consumption.	2 95	2 75	3 35	3 34	3 64
¶ Jersey City, N. J., and New York, via Morris Canal	2 85	2 35	3 17	3 24	3 54
Andover, via Delaware, Lack. and and Western RR	3 30	3 10	3 70	3 69	3 99
§ Trenton, Somerset Junction and Greensburg, via P. RR. Belvidere Division	2 65	2 45	3 05	3 04	3 34
Trenton, for shipment, including shipping and wharfage	2 11	1 95	2 45	2 46	2 76

‡‡ Rates on line coal from Hazleton are 10c. per ton above these figures.

‡ The cost of unloading is to be added to these rates. No charge less than 40c. per ton will be made for any distance. Tolls from Mauch Chunk to Phillipsburg for way points will be $1 15 per ton.

§ Twenty cents per ton less when five cars at a time to one party. Provided that where the reduction makes the rate $1 a ton, or less, the rate will be $1.

¶ 20 cents per ton additional for transferring coal from boat to boat, and 30 cents per ton for reshipment of same from wharves.

The following rates of freights and tolls on Schuylkill coals are to take effect from and after March 1, 1875:

Schuylkill Coals. per ton of 2240 lb.	From Pine Grove.	From Tamaqua.	From Port Carbon.	From Mount Carbon.	From Schuylkill Haven.
To * *Port Richmond*, for shipment, via P. & R. R. R., Main Line	1 87	1 82	1 75	1 74	1 67
Philadelphia, Retail yards	1 97	1 92	1 85	1 84	1 77
Harrisburg, via Lebanon Valley Branch	1 23	1 80	1 73	1 72	1 65
Allentown, via East Pennsylvania Branch	1 52	1 47	1 40	1 39	1 32
Lancaster, and Points on Lancas- Branch, via R. & C. R.R.	1 57	1 52	1 45	1 44	1 37
Dauphin, via Schuylkill and Susquehanna Branch	62	....	1 25 via Aub	1 24 urn.	1 17
Jonestown, via Lebanon and Tremont Branch	86	...	1 69	1 68	1 61
Lebanon, via Lebanon and Tremont Branch	90	....	1 88	1 87	1 80

* On and after March 1, 1875, a charge of fifteen cents per ton will be made for shipping anthracite coal at this point.

From *Tamanend* to *Catawissa*, via Catawissa and Williamsport Branch Railroad 94

From *Tamanend* to *Williamsport*, via Catawissa and Williamsport Branch Railroad 1 39

The rates of freight and tolls on lump, steamboat, and broken coal will be ten per cent. less than the above rates.

An additional charge of twenty-five cents per ton will be made on chestnut and pea coal, to whatever point consigned. If the shipper signs a release of all demands arising from a deficiency of weight at the place of destination, and agrees to indemnify the company from all claims by reason thereof, such additional charge will not be made.

On all coal shipped by canal at Jonestown, such drawback will be paid as will reduce the joint lateral and main line rate to three cents per ton per mile from the colliery from which shipped to Jonestown.

LATERAL RAILROADS IN COAL REGION.

1. For shipment via Main Road or Schuylkill Canal one and one-half cents per ton per mile, and two cents per ton additional, to Port Carbon, Mount Carbon, Schuylkill Haven, Pine Grove, Tamaqua, or Port Clinton, for canal, as the case may be.

2. Coal sent to points on the Catawissa & Williamsport Branch will be charged one and one-half cents per ton per mile, and two cents per ton additional, to Tamanend.

3. For consumption at local points in coal region, including Shamokin, Herndon, Schuylkill Haven, Pine Grove, and Tamaqua, three cents per ton per mile, and two cents per ton additional; and a charge for car service, of fifteen cents per ton to individuals, and five cents per ton to manufacturers, on all coal carried in Philadelphia & Reading Railroad cars.

4. Coal sent westward via Northern Central Railway (in N. C. R. W. Co.'s cars) will be charged four and two-tenths cents per ton per mile, to Locust Gap, Shamokin, or Herndon.

5. No charge will be made less than twenty-five cents per ton, including freight, tolls, and car service.

6. One mile extra will be added for coal passing through the East Mahanoy Tunnel.

7. Fractions of distances and rates will always be stated in tenths.

8. No charge will be made for weighing or making returns of coal shipped, and the latter will be furnished free of charge, upon application to the Weighmaster; if these returns are to be sent by mail, envelopes, properly stamped and addressed, must be furnished to the Weighmasters.

9. All coal will be charged the rates, (both lateral and Main Line) current on the day it is weighed; it will also be waybilled the same day.

Freights on Bituminous Coals from the Mines to Tide-Water Shipping Ports.

From the Mines to Cumberland and State Line (say an average of 20 miles) the charge is 3 cents per ton of 2240 lb. per mile.

From State Line to Amboy (346 miles) $4 00 per ton of 2000 lb. On coal shipped beyond this point there is a drawback of 50 cents per net ton.

From Cumberland to Baltimore, (178 miles) $2 58 per ton of 2240 lb., or $2 02 per net ton, and 4 cents per gross ton for use of cars.

From Cumberland to Georgetown, (152 miles) by canal, $1 76 per ton of 2240 lb. *To Alexandria, Va.,* 11 cents per ton more.

From the Mines to Piedmont, (from 4 to 10 miles) 5 cents per ton of 2240 lb per mile on distances less than 5 miles, and 4 cents per ton per mile on distances not over 10 miles.

From Piedmont to Baltimore, (206 miles) $2 69 per ton of 2240 lb., or $2 40 per net ton.

From any point in the Kanawha Valley to the James River wharves below Richmond, (say 350 miles) by C. and O. R. R., including terminal charges, per ton of 2240 lb., for Cannel coal, $4 50.

Do., do., for Semi-Cannel or Splint, per ton of 2240 lb., subject to rebate on shipments of 5000 tons or more, $3 65.

From Irwin to W. Phila. (say 332 miles) per P. R. R. Penn. Westmoreland gas coal, per ton of 2000 lb.....$5 00

From Osceola to W. Phila. (say 248 miles) per T. & C. R. R., per ton bituminous coal of 2000 lb..... 3 55

From Fairmount and Clarksburg to Baltimore (say 300 miles) via B. & O. R. R., including loading, per 2000 lb..... 5 20
On through coal after deducting drawback..... 4 15

From Richmond, Va., to New York, 392 miles per 2000 lb.. 2 00
" " " *Boston,* about 650 " " 2 50
" " " *Philadelphia,* 292 " " 1 25

From the Mines to Richmond, via James River and Kanawha Canal, 15 miles..... 15

IRON MARKET REVIEW.

New York.

March 13, 1875.

American Pig.—The anthracite coal strike stands nearly as it did a week ago. The demand for iron shows no improvement. There has been, and will be, a certain quantity used during all times, but we are unable to learn of any increased demand from consumers. Some claim to see a demand which must come in the early future, while others, equally familiar with trade, can see no great encouragement. An improvement will probably come with the opening of navigation, but the question then arises: will it be of sufficient importance to give strength to prices? Should the prevailing prices continue after a supply of coal, at reasonable prices, is guaranteed, there will be some additional furnaces blown in, and, unless the demand shows a marked improvement, we will again see a surplus, and probably the customary accompaniment—a weak market. We are reported 700 tons of No. 2 Foundry Hudson River iron at a private price, and 300 tons of Lehigh iron, No. 1 Foundry, for shipment to San Francisco at $28. The foundries in this city are not receiving increased quantities of orders. It is impossible, at the present time, to predict the probable demand for building purposes. We quote No. 1 Foundry at $27@$28; No. 2, $26; Gray Forge, $24@$26.

Scotch Pig.—There appears to be a little more inquiry for this article, but the only business we learn of is a sale of 200 tons, to arrive, at a private price. The asking price for freights by steamer from Glasgow to this port is 10/, and 7/ 6d. is bid. We quote Eglinton at $34@$35, and Coltness at $37@$38. We were unable to learn of any Glengarnock being in the market. As per circular of JOHN E. SWAN & BROTHERS (Limited) there were 29,164 tons of pig iron in store at Glasgow, Feb. 26, as compared with 41,650 tons at the corresponding time last year. Per cable the Glasgow market closed yesterday at 90/ for Coltness; Gartsherrie, 87/; Summerlee, 87/; Glengarnock, 86/; Langloan, 88/; Carnbroe, 83/; Eglinton, 75.

Rails.—There are better indications of business, and we hope to be able to report some sales next week. We have had some reported to us, but consider them a little premature, and will omit mention of them until our next. We quote American at $48@$50 at works. In conversation with a maker, he expressed considerable contentment at being able to secure orders at these figures to run his mills.

Old Rails.—There is some inquiry, but buyers' and sellers' views differ. We quote at $30, but some stock in this market is being held at a higher figure.

Scrap Iron.—During the last two weeks, there have been sales aggregating 2,500 to 3,000 tons—1,100 tons of which we reported in our last—at prices ranging from $33 to $35, the latter being the asking price. An offer of $34 was made yesterday for some good scrap, and refused.

Boston.

March 6, 1875.

The *Commercial Bulletin* says: "Pig seems to be in firmer feeling, although the causes are not very clearly defined. The condition of affairs in Pittsburgh seems to be one reason, and another is the idea that the bottom has been reached, and things must change for the better. There have been no buyers in who have taken any round lots, nothing moving except small quantities at a basis of $30 per ton for No. 1. The bulk of the inquiries are for low grades. Prices are unchanged, ruling at $27@$28 for No. 1; $24 50@$26 for No. 2; $22@$26 for gray forge. Bar shows no falling off in the slight firmness of the past week. Stocks are gradually being lowered, and sales are made at the usual figures, there being not enough firmness to justify any advance in rates. Refined sells in moderate quantities at $58 80 to $60. Steel shows no change, selling in a small way at, for American tool, 15@15¼c.; English do., 16@17c.; American machinery, 9½@10c. Copper is flat, the demand not being enough to be mentioned, and prices are nominal at 21¾@22c. We quote New Sheathing 28c.; Bolts and Braziers, 30c.; Yellow Metal Bolts, 28c. Lead is quiet and without change at $5 90 for small lots domestic; Sheet and Pipe, 9c. currency; Tin-Lined Pipe, 16¼c.; Bar Lead 9c., less usual trade or 10 per cent. discount. Spelter shows no improvement at 6¾c. currency. Tin is sold in small lots, as necessities compel purchases. We quote at 22c. for Straits. Refined English is unchanged for 21¾c. gold. Plates are active; we quote Charcoal I. C. $11 25@$12 50; Coke, $9@$10; and Terne at $8 50@$12 50 per box, currency.

Cincinnati.

March 9, 1875.

Specially reported by Messrs. TRABER & AUBERY, commission merchants for the sale of pig iron, blooms, ore, etc.

The metal market is less active, but prices remain unchanged. We quote:

CHARCOAL.

Hanging Rock, No. 1, Foundry	$28 00@29 00	4 mos
" No. 2, "	26 00@27 00	4 mos
" Mill	26 00@	4 mos
Tennessee No 1, Foundry	27 00@28 00	4 mos
Tennessee. No. 2 "	25 00@26 00	4 mos
" Mill	25 00@26 00	4 mos
Missouri, No. 1, Foundry	30 00@32 00	4 mos

STONE COAL.

Ohio No. 1, Foundry	27 00@28 00	4 mos
" No. 2, "	25 00@26 00	4 mos
Ohio Mill	25 00@26 00	4 mos
Missouri, No. 1, Foundry	28 00@30 00	4 mos
" No. 2, "	26 00@27 00	4 mos
" Mill	26 00@27 00	4 mos

CAR-WHEEL.

Hanging Rock, C. B	40 00@52 00	4 mos
Tennessee "	40 00@45 00	4 mos
Missouri "	40 00@45 00	4 mos
Alabama "	40 00@45 00	4 mos

BLOOMS.

Charcoal	75 00@ 90 00	cash

SCRAP IRON.

Cast	75@ 1 00	cash
Wrought	1 20@ 1 50	cash

Cleveland.

March 9, 1875.

Specially reported by Messrs. C. E. BINGHAM & Co., dealers in pig iron and iron ore

Prices are without material change.

No. 1, Lake Superior Charcoal	32 50@....
No. 2, " "	31 50@....
No. 3, " "	30 50@....
No. 4, " "	32 00@....
Nos. 5 and 6 "	33 00@....
No. 1, Bituminous foundry	28 00@ ...
No. 2, " "	27 00@....
No. 1. " Gray Forge	25 00@....
American Scotch, No. 1, Cherry Valley	33 00@....
" " No. 2	29 00@....
No. 1, Massillon	31 00@....
B—1, "	29 00@ ...
No. 2, "	27 00@ ...

Indianapolis, Ind.

March 9, 1875.

Specially reported by NELSON KINGMAN, broker and dealer in pig iron, etc.

Trade very dull at prices named below.

New Rails at mill	$56 00@58 00	
Old Rails "	28 00@30 00	
Hanging Rock Charcoal Pig No. 1 foundry	29 00@32 00	4 mos
" " " " " 2 "	27 00@30 00	4 mos
" " " Mill	25 00@28 00	4 mos
Car Wheel C. B	45 00@50 00	4 mos

STONE COAL.

Indiana No. 1 Foundry pig Red Short	30 00@33 00	4 mos
" 2 " " "	28 00@30 00	4 mos
" 1 Forge " "	@	4 mos
" 2 " " "	@	4 mos
Ohio No. 1 Foundry pig Cold Short	28 00@30 00	4 mos
" 2 "	26 00@29 00	4 mos
" Mill	25 00@28 00	4 mos
" No. 1 Foundry, Neutral	30 00@34 00	4 mos
" No. 2 " "	28 00@30 00	4 mos
Merchant Bar	2·35c.	3 mos
1st quality C. H. No. 1 Boiler Plates, per lb	5½c.	3 mos
1st " Com. Sheet, for No. 24, W.G. "	4 c.	3 mos
1st " Charcoal Sheet " " "	6 c.	3 mos
Best Bloom Galvanized Sheet, discount 20 per cent		cash.
2dquality " " " 30 "		cash.

f. o. b. in Indianapolis.

Louisville.

March 9, 1875.

Specially reported by Messrs. GEORGE H. HULL & Co.

The market is quiet but firm.

The usual time, 4 months, is allowed on the quotations below.

HOT BLAST—CHARCOAL.

No. 1 foundry, from Hanging Rock ores	$28 00@29 00
No. 2 " " "	26 00@27 00
No. 1, forge, " "	25 00@26 00
No. 1, foundry, " Tennessee "	26 00@27 00
No. 2 " " "	25 00@26 00
No. 1, forge, " "	25 00@26 00
No. 1, foundry, " Alabama "	26 00@28 00
No. 1 " " Iron Mountain "	28 00@30 00

HOT BLAST—STONECOAL.

No. 1, foundry, from Missouri ores	28 00@29 00
No. 2, " "	27 00@28 00
No. 1, forge " "	27 00@28 00

COLD BLAST—CHARCOAL.

Wheel from Hanging Rock ores	40 00@50 00
" " Tennessee "	35 00@38 00
" " Alabama "	38 00@40 00
" " Georgia "	38 00@40 00
" " Missouri "	38 00@40 00
" " Kentucky "	30 00@45 00

Pittsburgh.

March 9, 1875.

Specially reported by A. H. CHILDS, Esq., commission merchant, for the sale of pig iron, blooms, ore, etc.

The price of pig iron is well sustained, although transactions for the past week or two have been small. The belief is general that the dead-lock will not last much longer, and holders feel confident that, when mills resume, their stocks will sell readily at, at least as much as is now being asked. Quotations are:

No. 1 foundry	$26 00@27 00—4 mos
No. 2 foundry	24 50@25 00—4 mos
Gray forge	24 00@ —4 mos
White and mottled	22 00@23 00—4 mos

Pig metal sales reported for the *American Manufacturer* for the week ended March 10, 1875.

BITUMINOUS COAL SMELTED FROM L. S. ORE.

10 tons No. 2 foundry	$25 00— cash.
170 tons gray forge	24 00—4 mos

CHARCOAL.

150 tons No. 1 foundry, H. R	$30 00@ 32 00—4 mos
10 tons cold blast, H. R	52 00—4 mos

COKE.

300 tons gray forge, Allegheny	25 00—6 mos
200 tons white, Allegheny	24 00—4 mos

BLOOMS.

10 tons Anthracite	70 00—4 mos

San Francisco.

From the *Commercial Herald* of February 25, 1875.

The *Ajax*, from Portland, brought us 100 tons Oswego pig iron, which, as before stated, is of superior quality, and finds prompt sale. Price, $46. The steamship *City of Peking* carried for ballast 400 tons of the 600 tons pig iron brought in her from New York. We have a full supply of Australian tin. This article is gradually gaining in esteem and promises in time to be an article of large consumption upon this coast. The stock of pig iron in first hands is inconsiderable, while the consumption is unusually large. Glengarnock, to arrive next summer, No. 1, is freely offered for sale at $38@40, with some sales. The present spot price for lots, $48@50. Tin Plate appears to be neglected, and prices both low and nominal. Outside of a steady fair jobbing trade in bar, bundle and sheet iron, we have little to remark. Banca, Straits and Australian block tin, low and nominal.

METALS.

NEW YORK, March 13, 1875.

Gold Coin.—During the week past gold has ranged from 114¾ to 115¾, and closed yesterday at 115¾.

Bullion.—Fine silver bar is quoted at $1 25½@$1.26¼; gold, per ounce, and fine gold bar at par ($20.67 gold per ounce,) to ¼ per cent. premium.

Copper.—The sales during the week aggregate about 150,000 lb., in a small way, at 21½@21¾c., with some offering now at the former figure. The London market is quoted at £81 10/ for Chili Bars. There is said to be more inquiry in this market, and there is a little better feeling. It is thought that the majority of the manufacturers will have to come into the market by the first of next month. Messrs. JAMES & SHAKSPEARE, under date of London, Feb. 26, say:

"We note sales of Chili ore and regulus (to arrive) by private contract at 16/ and 16/ 6d. per unit respectively. The Swansea Ticketing of 23d inst. went off at an average of 16/ 5¾d., the average produce being 31 13-16 per cent.; the quantity consisted of 923 tons from the Cape, and 12 tons only from other places, which accounts for the comparatively high average price paid for the whole sale. Bars have been steady throughout the week at £83 for good ordinary brands, cash and short fixed prompt; but, at the close, there seemed a slight tendency to advance on this rate, although sellers made no positive move in that direction. The Chili charters, for first half of present month, became known on 23d inst., and were advised as 1,200 tons bars and ingots, 500 tons pure in ores and regulus for England, 100 tons of bars for France. The market was entirely uninfluenced by the news, either in an upward or downward direction; and such is the inanimate condition of the trade, that no attention is paid to circumstances which, in ordinary times, usually gave rise to some fluctuations in price. Australia ports are quite neglected, and the sales of the week were restricted to a few lots of outside brands, which went at figures enabling them to compete with English select. The demand for sheets is quiet, but a

fair inquiry exists for Tough at £88, and select at £89 to £90 per ton, but sellers at these rates are scarce."

Tin.—There is some business doing in a small way, but the market is still very quiet. There is, however, considerable inquiry, and a better feeling. We quote Straits at 21½@21¾c.; Refined, 21@21¼c.; L. and F., 20¼@20¾c.; Banca, 25@25½c., prices all gold. Straits, for future delivery, is quoted at £89 in London. There is more doing in tin plates, but it is only in a small way. There is, however, a considerably increased inquiry. We quote I. C. charcoal at $9 75@$10; charcoal ternes, $8 75@$9; coke tins, $7 75@$8; coke ternes, $7 25@$7 75, prices all gold. Messrs. JAMES & SHAKESPEARE, under date of London, February 26, say:

"English continues very depressed, and can be purchased on easier terms. The market for foreign sorts is quite disorganized, and since Friday last sales have been reported at various prices down to 87/ 6d. for Straits and 86/ for Australian. This sudden fall, however, appears to have attracted the attention of buyers, who, during the last few days, have shown more inclination to purchase, and values are, therefore, a trifle higher, more especially as the greater part of the metal now available is held for higher rates than those printed in our list."

Lead.—We are only able to learn of a sale of 25 tons of domestic at $5 72½ gold. The market may be quoted at $5 70@$5 72½. Some are anticipating better prices, but others, in view of the large stock (about 7000 tons) in this market, with large prospective receipts, take a rather despondent view of the future. Spanish lead is lower, and is quoted at £21 in London. In this market it is quoted at $6 75 gold.

Spelter—is only selling in a small way at 6¼@6⅝c. currency, according to terms of sale rather than quality. Some lots continue to be forced on the markets, from the anxiety of certain makers to realize. There is nothing doing in foreign, which is quoted at 7@7¼c. gold. Sheet zinc is quiet, but firm at 9@9¼c. gold.

Antimony.—This article is very quiet at 12¼@12½c. gold.

Quicksilver.—The latest London quotation to hand is £21, nominal, per flask of 75 lb., in warehouse. In this city the price is $1 45 per lb., and in San Francisco, $1 35 per lb.

FINANCIAL.

New York Stocks.

March 10, 1875.

The sales of stocks at the New York Stock Board, during the past week, exhibit a slight falling off from those reported for the week ending the 3d inst. Prices however, of both stocks and bonds have materially improved, the market closing firm.

Quotations are as follows:

	Highest.	Lowest.	Closing
Pennsylvania Coal Co.	—	—	240
Consolidation Coal Co.	43	42⅜	42⅛
Spring Mt. Coal Co.	—	—	64
American Coal Co	—	—	50
Maryland Coal Co.	—	—	17¼
Cumberland Coal and Iron Co.	—	—	—
N. Y. & Nova Scotia Iron Co.	—	—	116
Del., Lack. & West. R.R. Co.	112	111	112
New Jersey Central R. R. Co.	111	109½	110¾
Delaware and Hudson Canal Co.	114	113¾	114
Quicksilver Mining Co. prefd.	—	—	—
" " " Common.	—	—	33½
Mariposa Land & Mining Co.	6¼	5½	5¾

Sales for the week, ending the 10th inst., inclusive, were as follows:

	Shares.	Price.
Del., Lack. and W. RR.	2,462 at from	111 to 112
Del. and Hudson Canal.	520 "	113¾ " 114
New Jersey Central RR	1,440 "	109½ " 111
Quicksilver Mining Co.	100 "	33½ ".....
Consolidation Coal Co.	450 "	42⅜ " 43
Mariposa Land & Mining Co.	300 "	5½ " 6¼
Maryland Coal Co	200 "	17¼ ".....
St. Louis & Iron Mountain R. R.	..... "	.. ".....
Spring Mountain Coal Co	200 "	64 ".....
Quicksilver Mining Co., prefd.	..... "	.. ".....
Pennsylvania Coal Co.	..... "	.. ".....
Total Sales	5,602 shares.	
Sales for the week previous	7,708 "	
Decrease	2,06 "	

The following are the sales of bonds for the same period:

	Amount.	Price.
Del., Lack. & W. RR convertible,	$11,000 at from	110½ to 110¾
N. J. Central RR. 1st consolidated mortgage bonds	24,000 "	104¾ " 105⅛
St. Louis & Iron Mount'n 1st Mtg bonds,	29,000 "	85 " 86
St. Louis & Iron Mountain, 2d Mtg. bonds	..... "	.. ".....
N. J. Central C.C.	6,000 "	107½ ".....
" " 1st Mtg. N.	8,000 "	110 ".....
Del. & Hudson Canal, 1st Mtg. Reg. bonds, 1891	..... "	.. ".....
Del. & Hudson Canal, 1st Mtg. Reg. bonds, 1884	..... "	.. ".....
Del. Lack. & W. R. R., Consolidated	..... "	— ".....
C. & O. R.R. 1st Mtg. Coupon	1,000 "	41 ".....

Philadelphia Stocks.

March 9, 1875.

A very material falling off has occurred in the sales of stocks at the Philadelphia market. Prices, however, exhibit a slight improvement over our last quotations. The transactions in bonds fully maintain the activity noted in our last, closing firm.

The transfer books of the second preferred stock of the Catawissa Railway Company closed March 4, and reopen on the 12th, when a distribution of 62¾ cents per share will be paid to those who were holders at the closing of the transfer books.

Quotations are as follows:

	Lowest.	Highest.	Closing.
Reading R. R. Co.	56¾	57	56⅞
Lehigh Valley R. R. Co.	63¼	63⅜	63¼
Little Schuylkill R. R.	—	—	48¾
Catawissa R.R.	—	—	20
" " Preferred	43	43½	43
" " New Preferred	38	39	38
Huntingdon and B. T. R.R.	—	—	7½
" " " " Preferred.	—	—	14
Minehill R.R.	—	—	53¾
Lehigh Coal and Navigation Canal.	49⅝	49⅞	49⅝
Morris Canal	—	—	50
" Preferred	127	128	127
Pennsylvania Canal	—	—	12½
Schuylkill Navigation Canal	—	—	7½
" " Preferred	—	—	14⅞
Susquehanna Canal	—	—	7
Westmoreland Coal Co.	—	—	—
Buck Mountain Coal Co.	—	—	—
Cambria Iron Co.	17	18	17½
Locust Mountain Coal Co.	—	—	—
Emaus Iron Co.	—	—	30

The following are the aggregate sales of stocks for the week ending March 9th:

	Shares.	Price.
Reading Railroad	2,133 at from	56¾ to 57
Lehigh Valley RR. Co.	509 "	62½ " 62⅝
Little Schuylkill RR.	.... "	— " —
Catawissa RR.	.... "	— " —
" " preferred	102 "	43¼ " —
" " new preferred	200 "	38 " 39
Huntington & B. T. R.R.	.... "	— " —
Huntington and B. T. RR., p'f'd	70 "	14 " —
Minehill RR.	.... "	— " —
Lehigh Coal and Navigation Canal.	4,878 "	49⅝ " 49⅞
Schuylkill Navigation Canal.	.... "	.. " ..
" " " p'f'd	50 "	15 " —
Morris Canal, preferred	40 "	127 "128
Susquehanna Coal Co.	.... "	..
Cambria Iron Co.	100 "	17½
Pennsylvania Canal	100 "	12½
Total sales	8,182 shares.	
Sales for week previous	20,101 "	
Decrease	11,919 "	

Sales of the various bonds for the period under review have been as follows:

	Amount.	Price.
Reading RR. 6s, 43-80	$ .... at	.. to ....
Catawissa RR., new 7s	9,000 "	103½ " 104
H and B. T. RR., 1st mortgage, 7s	500 "	108⅛ " ....
Lehigh convt. gold loan Ex-interest	500 "	103⅜ " ....
Pa. and N. Y. Canal, 7s	7,000 "	106¼ " ....
Schuyl. Nav. 6s, '82	4,100 "	79½ " 80
L. V. RR. 6s, coup.	.... "	.. " ....
H. and B. T. 1st Con. bonds	12,000 "	54 " ....
R. C and I. Co. irregular mort. bonds, Bill Tract	.... "	.. " ....
Lehigh Nav. 6s, 1884	12,900 "	100¾ " ....
Reading RR. debenture bonds	.... "	.. " ....
" " R. G. M. 7s, coup.	1,000 "	107 " ....
" " new convertible 7s	200 "	106 " ....
Reading C. and I. Co. debenture bonds.	.... "	.. " ....
Reading C. and I. Co. mort. bonds, Tamaqua Tract	.... "	.. " ....
Reading C. and I. Co. mort. bonds, St. Clair Tract	.... "	.. " ....
R. C. & I. Co., Wetherill tract	1,000 "	95 " ....
" " " " Locust Mountain Summit Improvement tract	.... "	.. " ....
R. C. & J. Co. Helfenstim tract	3,000 "	93 " ....
Lehigh Valley RR. 6s, registered	17,000 "	103 " ....
" " " 7s	.... "	.. " ....
Lehigh Coal & Nav. Co. 6s, gold loan	22,500 "	100¾ " 101⅛
" " " " 6s, RR. loan	3,000 "	100 " ....
" " " " 6s, 1884	.... "	.. " ....
Schuylkill Nav. 6s, '95	9,000 "	79½ " ....
" " 7 per cent. boat loan	.... "	.. " ....
" " 6 " " "	.... "	.. " ....
" " Div'd scrip 133.50-446.40	405 "	92 " 92¾
R. C. & I. Co., Glentworth tract	.... "	.. " ....
Chesapeake & Delaware Canal, 6s.	.... "	.. " ....
Susquehanna Canal, 6s.	.... "	.. " ....
Pennsylvania Canal, 6s.	.... "	.. " ....
Shamokin Valley & Pottsville R.R., 7s.	.... "	.. " ....
Allegheny Valley 7 3-10s	6,000 "	91¾ " 92
" " " Eastern Ext'n.	1,000 "	86 " ....
Del. Div. Canal, 6s	3,000 "	95 " ....

Gold and Silver Stocks.

SAN FRANCISCO, March 10, 1875.

A decidedly upward movement has taken place in the San Francisco stock list. Savage is $27; Ophir, $41; Consolidated Virginia, $27; California, $9; Overman, $12; and Mexican, $10 per share in advance of our quotations dated the 3d inst. A remarkable feature of the report is the decline in Eureka, Grass Valley, which is quoted at $4 per share—a fall just one-half, as compared with our last. The Savage Mining Company have levied an assessment of $5 00 per share, delinquent March 24.

Quotations, March 10, 1875:

Gould & Curry	19	Raymond & Ely	51
Savage	142	Eureka G. Y.	4
Chollar Potosi	65	Best & Belcher	53
Ophir	123	Kentuck	14
Hale and Norcross	48	Meadow Valley	10
Crown Point	30	Alpha	18
Yellow Jacket	81	Sierra Nevada	15
Belcher	34	Union Consolidated	11
Imperial	8	Mexican	34
Consolidated Virginia	470	Caledonia	19
California	69	Silver Hill	7
Overman	58		

Copper Stocks.

BOSTON, March 11, 1875.

The market for copper stocks has been fairly active during the week, with quotations nominally unchanged, if we may except Allouez, which stock has declined to $3 50 per share. We note the following sales during yesterday's operations of the Board: 100 shares of Calumet and Hecla at from 144¾ to 145; 33 shares of Quincy at 36½; 100 shares of Ridge at $6 per share; and 450 shares of Allouez and 400 shares of Copper Falls at our quotations.

Quotations are as follows:

Allouez	3½	Pewabic	—
Calumet and Hecla Co.	145	Phœnix	1¾
Copper Falls	9	Quincy	36
Central	23	Ridge	6
Franklin	—	Rockland	1

American Institute of Mining Engineers.

OFFICIAL BULLETIN.

Announcements to Members and Associates.

I. The ENGINEERING AND MINING JOURNAL, which is the Organ of the Institute, and contains its proceedings, transactions and notices of meetings, will be sent to each Member and Associate on the payment of his annual dues. Back numbers cannot, as a rule, be sent.

II. Dues (ten dollars per annum) are payable on election and at the annual (May) meeting. Members and associates elected at the February meeting pay ten dollars only to May of the following year. Remittances should be made, as far as possible, by P. O. Order, payable to the Secretary.

III. Blank proposals for membership can be had on application to the Secretary.

IV. The second volume of Transactions has been mailed to all home members and associates not in arrears. Any member who failed to receive his copy will please notify the Secretary promptly. The Institute is not responsible for the loss of the volume in those cases where members have changed their residences and have omitted to inform the Secretary. Volumes I. and II. will be sent, post-paid, to non-members, at five dollars each.

V. Members are earnestly requested to inform the Secretary promptly of any change of address.

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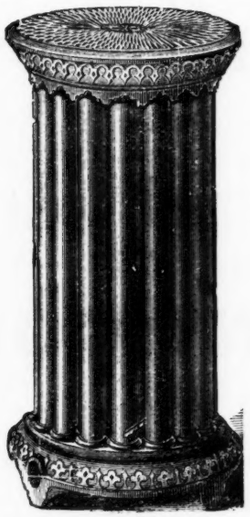

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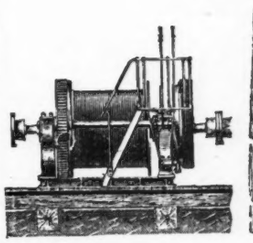

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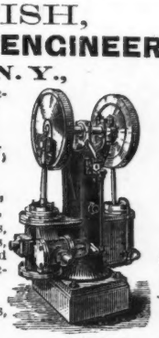

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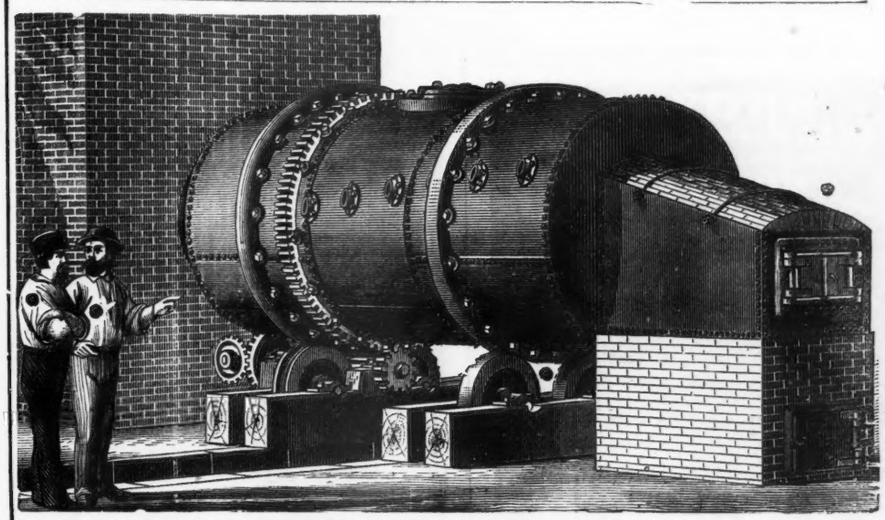

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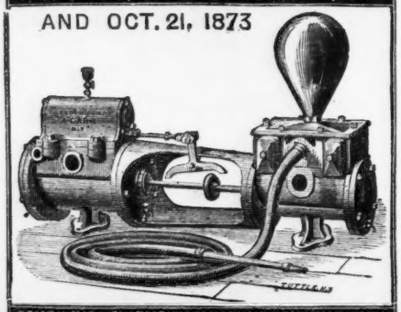

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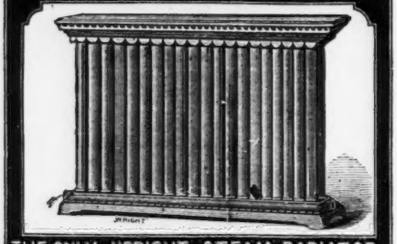

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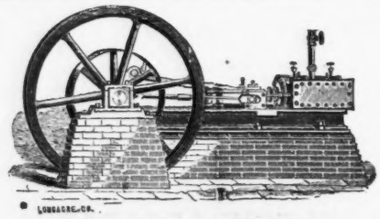

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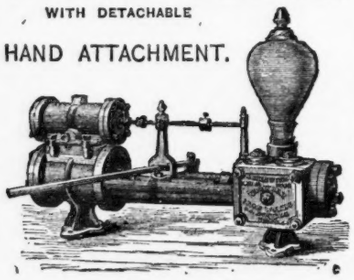

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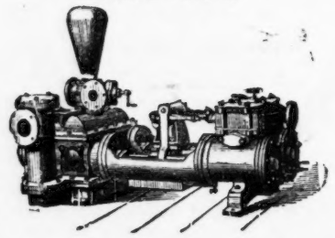

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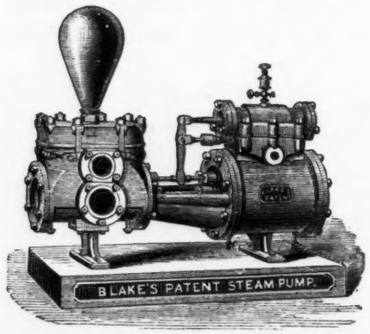

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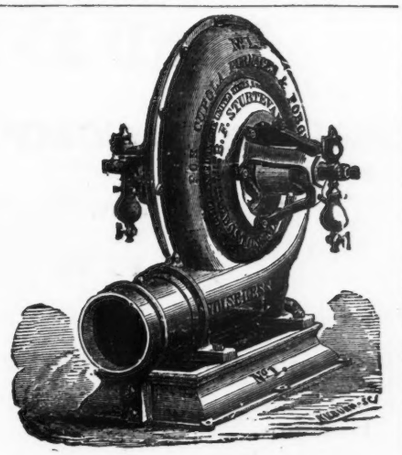

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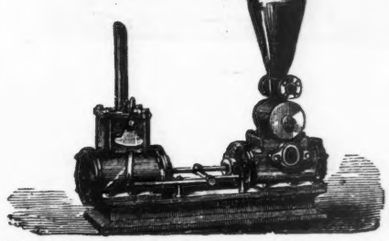

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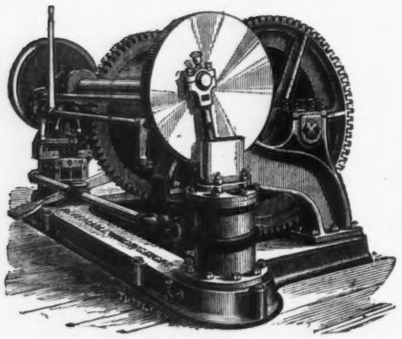

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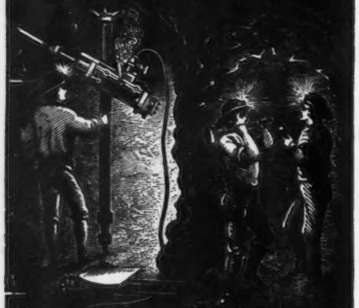

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